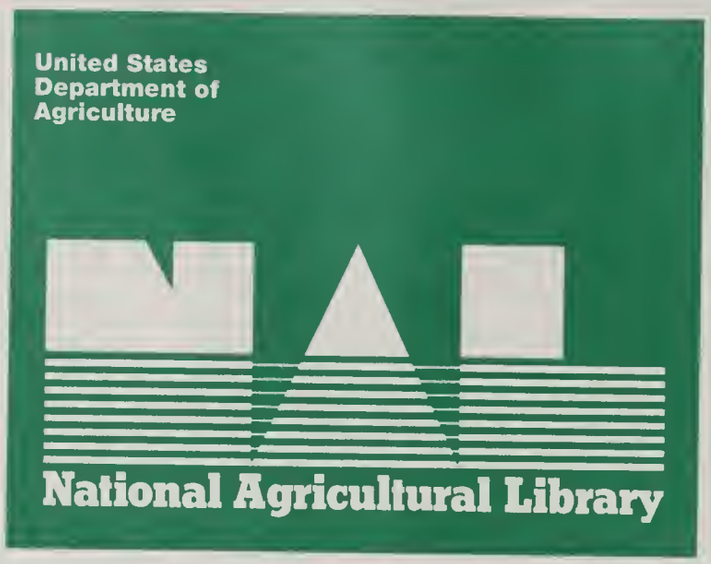
Government Intervention in Moroccan Agriculture

Evolution of Subsidy Equivalents and Possible Trade Reform Effects

Mark D. Wenner



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Abstract

Morocco's agricultural policies are surveyed and aggregate measures of support are calculated for eight commodities (wheat, barley, corn, cotton lint, raw sugar, wheat flour, edible vegetable oil, and refined sugar) for the years 1982-89. During this period of economic adjustment, producer support peaked then declined, while consumer subsidies fluctuated. In the event of a GATT agreement liberalizing global agricultural trade and pricing policies, Morocco, as a net food importer, would be vulnerable to increased import prices. The combined effects of internal and possible external reforms underscore the importance of designing a more cost-efficient food security system.

Keywords: Morocco, aggregate measure of support, producer subsidies, consumer subsidies, PSE, CSE, wheat, wheat flour, barley, corn, cotton lint, sugar, vegetable oils, trade liberalization, GATT.

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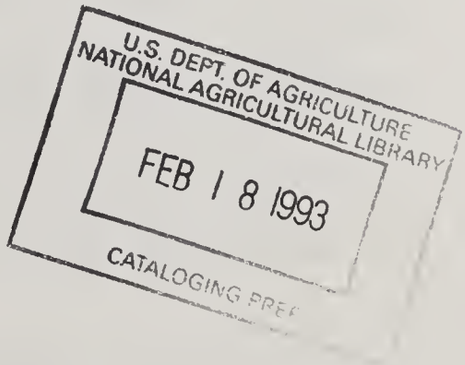

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Mark D. Wenner

Introduction

Since 1983, Morocco has pursued unilateral agricultural liberalization with the technical assistance and financial support of various international donors. Since then, the Government has succeeded in freeing certain producer markets, reducing some input subsidies, and better targeting consumer food subsidies. These reforms, intended to encourage more efficient and profitable patterns of production as well as to reduce budgetary pressures, have been largely successful. But challenges and bottlenecks remain. Accelerated reforms threaten to heighten social tensions. Therefore, emerging as a high-priority item is for the Government to choose the intervention with the least cost that stabilizes selected prices and minimizes risk.

The ongoing and planned domestic reforms could imply mixed export opportunities for U.S. agricultural commodities. In the 1980's, U.S. agricultural exports to Morocco averaged $214 million per year (27).[1] This sales volume makes Morocco the third largest African export market, after Egypt and Algeria, but a modest one compared with some Asian and Latin American countries. The principal U.S. exports to Morocco are wheat, wheat flour, corn, and oilseed products. Average U.S. wheat volume exports are 1.1 million metric tons per year, accounting for 65 percent of total import volume (27). Similarly, U.S. corn exports averaged 123,000 metric tons per year and comprised 63 percent of the total amount of corn imported by Morocco (27). Currently, Moroccan state trading monopolies and an overvalued currency stimulate grain import demand. These monopolies are expected to be reformed and price controls replaced with some version of a transparent reference price linkage scheme. Price band stabilization measures and further devaluation would cut some of the demand. However, changes in relative prices could induce producers to shift away from soft wheat into other more profitable commodities, thereby creating more import needs.

Besides the internal changes, Morocco may be subject to external policy developments that directly affect import capacity and, subsequently, food security and price stabilization. Ongoing multilateral negotiations on the General Agreement on Tariffs and Trade (GATT) are aimed at reducing agricultural subsidies. If the talks succeed in lowering government support of agriculture, Morocco, a country that depends on wheat imports, would face higher import bills due to inelastic demand but would have better access to the European Community (EC) markets for its exports to generate the needed foreign exchange.

Morocco now depends on imports for 30 percent of its total grain consumption. In the case of wheat, a dietary staple, import dependence averaged 42 percent per year between 1980 and 1990 (27).

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[1]Underscored numbers in parentheses refer to sources listed in the References.

Meanwhile, its citrus, vegetable, processed food, fresh flower, fish product, and textile exports face quantitative restrictions and tariff barriers in the EC, the country's primary export market (6).

In the absence of global agricultural liberalization, Morocco will continue to enjoy the artificially low international grain prices, a result of the competition between the United States and the EC to dispose of their surplus production. If Morocco fails to improve productivity in its tradable sector and enhance its export access to industrial country markets, either through GATT or bilateral preferential trade arrangements, it may see the growth benefits of its unilateral economic reform program diminished.

This report reviews Moroccan trade and economic policy developments and quantifies the transfers resulting from Government intervention in eight commodity markets between 1982 and 1989, using producer and consumer subsidy equivalents (PSE's and CSE's). The purpose is to identify the nature and scope of Government intervention in the various markets, to trace the evolution of intervention over time, and to check for consistency between stated policy goals and observed performance. It also analyzes the possible implications for producers and consumers if multilateral trade liberalization occurred under the GATT.

Morocco's reform experience and future challenges should be noteworthy to a variety of U.S. audiences for different economic reasons. To agricultural policy analysts and developing-country decisionmakers, Morocco's case can illustrate the impacts of and the constraints to agricultural liberalization faced by small, resource-constrained countries. Morocco, like many countries in the Sahel and the Islamic crescent running from the Maghreb in the west through the Middle East in the center to central Asia in the east, faces high population growth rates, possesses limited fertile land, and confronts substantial annual rainfall variability. These factors, especially in non-oil producing and water-scarce States, contribute to food insecurity and vulnerability in a rapidly integrating world economy. Countries such as Morocco face the risk of opening their economies and "getting the prices right" yet being hurt by structural rigidities such as poorly functioning factor markets, protectionist barriers in primary export markets, and weather-induced production shortfalls. How these vulnerable economies fare will have a direct bearing on future global prosperity, the demands on international donors and financial markets, immigration flows, and the sustainable use of natural resources.

A second audience includes U.S. agricultural trade interests and investors who seek an understanding of the Moroccan policy environment. Morocco represents a modest but potentially growing export market for cereal and oilseed products if further reforms are adopted. This export market has grown at an 11-percent annual rate between 1962 and 1988 and is projected to grow to the $270-million range in 1993/94. The United States has long been a dominant wheat and coarse grain supplier. However, domestic wheat production gains, competition from the EC via export subsidy programs, and trade restrictions have dampened export volumes in recent years. The contemplated unilateral freeing of the soft wheat market and a reduction in corn and livestock tariffs, for example, would enhance U.S. export opportunities (13). Thus, ongoing reforms and reforms induced by a successful conclusion to the GATT negotiations would directly affect U.S. export interests. In addition, Morocco is emerging as a strong horticultural exporter to the EC and the Government of Morocco and the United States Agency for International Development (USAID) are actively seeking to attract agribusiness investment and trying to improve the horticultural and food processing subsectors (30).

Macroeconomic and Trade Overview

Morocco is a largely semi-arid, middle-income country at the northwestern tip of Africa. Its 1990 population was 25.1 million with a per capita income of $1,002 (6). Between 1970 and 1988,

Morocco's gross domestic product (GDP) grew 6.6 percent per year, and its population increased an average 2.5 percent per year (6). The highest rates of economic growth occurred in the late 1970's, during the phosphate commodity boom. In the 1980's, the economy slowed as a debt crisis was resolved. Demographic pressure persists with the population growth rate remaining high, 2.6 percent in 1987. Development problems, such as land tenure and its effect on agricultural supply response, employment generation, export performance, and sustainable resource use, also loom large (29).

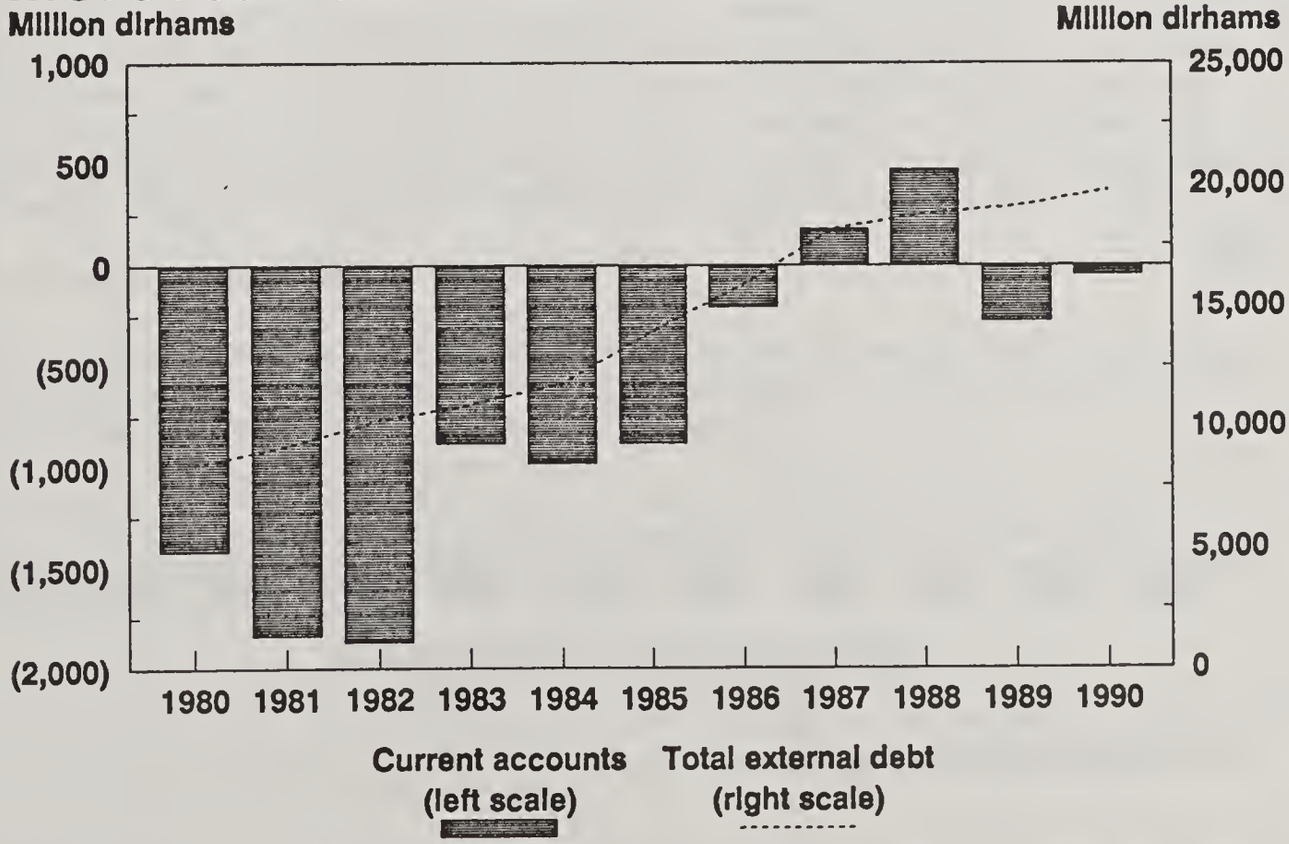
Government and services generate the largest share of GDP, accounting for 38 percent in 1988, while agriculture contributes 17 percent and manufacturing, 34 percent. In terms of employment, agriculture is the most important sector, directly employing 39 percent of the labor force and indirectly supporting about 57 percent of the population. It also generates about 25 percent of total export revenue (6, 35).

Like many developing countries, Morocco is heavily indebted and plagued with budget and trade deficits (fig. 1). Morocco enjoyed a brief boom (1973-75) due to high phosphate prices, but then entered a period of disequilibria. Increased military expenditures associated with the reclaiming of the western Sahara, the collapse of phosphate prices, the second oil crisis, droughts in 1979 and 1981, and rising interest rates on foreign loans combined to create a fiscal and balance-of-payments crisis in the early 1980's (1, 14).

In 1989, total outstanding debt was estimated at $19 billion (34). The level of indebtedness jumped from $1.7 billion in 1976 to $7 billion in 1980 largely because of military expenditures (34). In the 1980's, the change in the absolute level of indebtedness slowed considerably compared with the

Figure 1

Moroccan external accounts



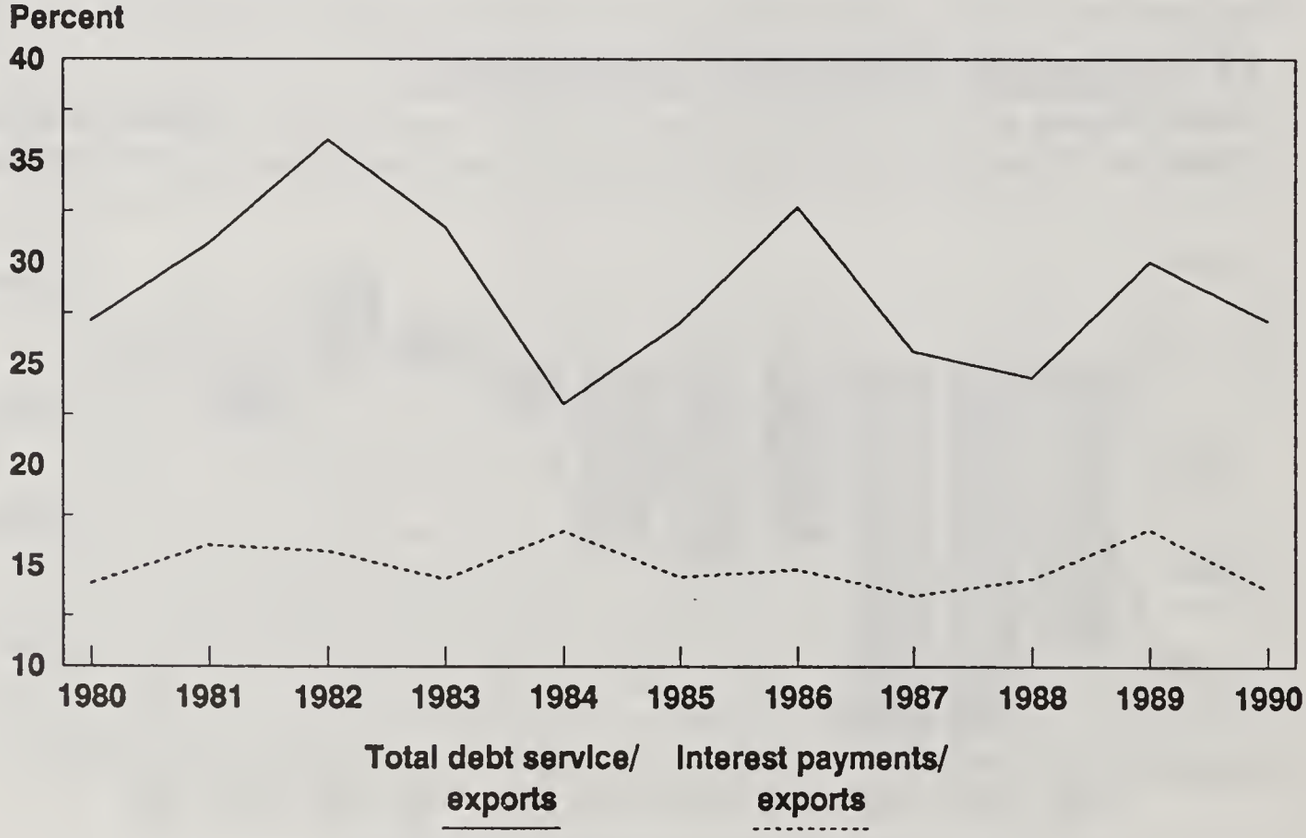
Source: International Monetary Fund.

previous decade, but the economy's ability to service the debt worsened as measured by the ratio of total external debt to gross national product. This ratio rose from 53 percent in 1980 to a peak of 124 percent in 1985 and then improved to 88 percent in 1989 (34). The high debt load implies that large proportions of its export earnings have to be expended on debt service, reducing domestic savings and investment rates and, ultimately, GDP growth rates (fig. 2).

Since 1983, the year Morocco rescheduled its debts, the country has undertaken a program of macroeconomic stabilization and economic restructuring. The chief objective of the program was to restore balance to the external accounts (35). In pursuit of this goal, significant reforms have occurred in the trade regime, exchange rate system, financial institutions, and the agricultural and industrial sectors.

Moroccan authorities generally devalued the dirham in nominal terms in order to cut import demand and enhance export competitiveness.[2] Tourism benefited tremendously from the devaluation, emerging as a major foreign exchange earner. Tourist arrivals more than doubled between 1982 and 1990 from 1.8 to 3.9 million (6). Merchandise exports as a share of GDP have remained constant. The 1980-82 (pre-adjustment) export share average was 14 percent, while the 1983-88 (post-adjustment) average was 15 percent (5). Nevertheless, the volume of Morocco's exports increased at an average annual rate of 10 percent in the reform period, compared with an average annual growth in Morocco's export markets of 7 percent. This positive response to trade liberalization, along with

Figure 2
Morocco's debt service ratios



Source: International Monetary Fund.

[2]Overvaluation persists in real terms, however. The percent overvaluation as measured by the equilibrium exchange rate used in the analysis moved down sharply in 1989.

favorable developments in international energy and wheat prices, helped to relax the foreign exchange constraint (5).

Financial sector reforms, such as higher interest rates on deposit accounts and convertibility of foreign worker accounts, have helped in attracting more worker remittances, bolstering the capital account. Remittances jumped 61 percent from $840 million in 1982 to $1.4 billion in 1989 while the number of Moroccans abroad doubled from 528,000 to 1.06 million (5, 6). Despite the massive emigration and tightening labor markets in Western Europe, per capita remittances declined only 13 percent from 1982 to 1989 (5, 6).

In the last few years, Government expenditures have been constrained while capital expenditures were severely slashed since policymakers find it easier to postpone investment projects than to drastically cut services. At the same time, tax revenue collection has improved through the passage of new taxes and more aggressive enforcement.

While the GDP growth rate and external accounts deficits fluctuated, Government finance and effective real exchange rates showed consistent improvement. The 1989 budget deficit fell to 6 percent of GDP, from a high of 14 percent in 1981 (6). The annual average inflation rate also fell from a high of 12.6 percent in 1985 to 3.1 percent in 1989 (6). Likewise, the effective real exchange rate index fell from 100 in the 1980 base year to 67.3 in 1989 (6).

As a result of these reforms, new loans, debt relief, and upward movement in the export unit values for phosphates and oranges, overall economic performance improved in the late 1980's. GDP at constant prices grew by 10.3 percent in 1988, faltered in 1989 to 1.3 percent, but recovered slightly in 1990 to 3.4 percent (6). After a decade of deficits, the current account balance showed its first surplus in 1988 (34). However, in 1989 the balance deteriorated dramatically, recovering slightly in 1990 (34).

Serious challenges to the Moroccan economy linger. The country has a $20-billion external debt and large debt service, an average annual 14-percent expansion rate in the money supply, a domestic liquidity crunch, and growing internal criticism of the income distributional consequences of the austerity measures (33). In December 1990, labor union unrest prompted the Government and international donors to become more sensitive to the erosion in real income (30). Statutory minimum wage rates were raised by 15 percent in both industry and agriculture in 1991 (30).

Natural Resource Base and Uses

Natural resource endowments and Government policies in Morocco have combined to shape production and trade patterns. Morocco's principal natural resources are large phosphate rock deposits and marine fisheries lying off a 2,100-mile coastline.

The mining of phosphate rocks and processing of chemical derivatives are the most dynamic subsectors, consistently recording the highest real growth rates and earning the most foreign exchange. Phosphate exports contributed about 43 percent of Morocco's total export receipts from 1980-89 (5).

The fishery subsector has enormous potential but is underdeveloped. Offshore production potential is estimated at 1.5 million tons per year while the 1989 fishing haul was 518,000 tons (6). Nonetheless, seafood exports have increased rapidly both in quantity and value and are the second largest agricultural export earner following citrus fruit.

Crop production is largely constrained by availability of arable land, rainfall variability, and a dualistic agrarian structure. Only 18 percent (7.9 million hectares) of Morocco's land mass is arable. On average, 5.6 million hectares are used for cropland, 1.4 million hectares are used for arboriculture, and 0.9 million hectares are fallowed each year (22). Wheat, barley, sugarbeets, and beans cover 80 percent of the cultivated area (21). The principal perennial crops are citrus, olives, dates, and grapes. Since water is the main constraint on agricultural production, the Government has invested heavily in irrigation. Irrigated area rose from 65,000 hectares in 1967 to 1.2 million hectares in 1989, or 10 percent of the total cultivated area (21, 35).

Agrarian Structure

Moroccan farms tend to be either large and modern or small and traditional. These categorizations correspond highly but not perfectly with cropping patterns, productivity, marketed surpluses, investment rates, and income level. In general, cereals tend to be grown by small-scale producers on rainfed plots with rustic techniques and few inputs. High-value export crops such as fruits and vegetables are grown on large, irrigated estates, using many purchased inputs. Productivity, as measured by yield per hectare and value added, is high in the irrigated sector and low in the rainfed sector. Irrigated farms constitute less than 10 percent of arable land, yet account for 45 percent of value added in agriculture (18).

The dryland subsistence subsector contributes little to marketed output but employs most of the population, especially the poor, thereby helping to maintain social tranquility. Farms of less than 5 hectares occupy 75 percent of the farmland (18). Most land is privately held (74 percent) with only 14 percent held in communal arrangements. However, the lack of title, high incidence of plot fragmentation, and high rate of landlord absenteeism (30-35 percent) inhibit formal credit markets and the incentive to make long-term improvements on the land (6). One specialized Government bank, Caisse Nationale de Crédit Agricole (CNCA), provides most of the institutional credit to Moroccan farmers: 65 percent of all short-term and 95 percent of all medium- to long-term loans. CNCA tends to lend only to medium- and large-scale farmers (10-50 hectares) due to risk and transactions costs (36). Small farmers (under 5 hectares) either do without loans or rely on informal credit markets (36).

Crop yields vary within both the irrigated and dryland sectors. In the high-potential or "bour favorable" dryland area around Fes-Meknes, farms tend to be mechanized and soft wheat yields are at world-class levels. On the coast between Rabat and Tangier, productivity is also good. In less favorable areas, yields fluctuate greatly in direct relation to rainfall.

Within the nine, large-scale, irrigated perimeters managed by quasi-public agencies called Regional Agricultural Development Offices (Offices Régionaux de la Mise en Valeur Agricole, ORMVA's), wheat production has been emphasized as a means of improving grain self-sufficiency and escaping the vagaries of rainfed cultivation (14). In 1988/89, cereals accounted for more than 60 percent of the planted area in the ORMVA's (12). Area cultivated in wheat expanded from 1979-89 while barley area declined. However, output performance has been mixed. Wheat yields, especially soft wheat, have shown strong increases in only two perimeters (12). Poorly adapted seed varieties, water distribution problems, and inappropriate cultivation techniques account for disappointing performance in the other seven perimeters (12). Medium- and small-scale irrigation schemes tend to produce more high-value goods than the large schemes and are believed to be more productive (12). There are no data to substantiate this, however.

In short, the dualistic nature of farms in Morocco and the difficult issue of land tenure may inhibit rapid supply response in a more liberalized environment.

Food Import Dependence

After energy, Morocco's most important trade issue is food import dependence. Morocco's principal imports are crude petroleum, manufactures, cereals, and vegetable oils. Imports averaged $4.2 billion in the 1980's with crude oil accounting for about 20 percent and food for about 13 percent or $546 million in any given year (5, 21).

Government concern centers on how to finance essential imports and how to stimulate and stabilize domestic grain output, thus reducing exposure to adverse movements in terms of trade. The mean annual percentage change in wheat production is considerably higher than the figures for rock phosphate prices and world wheat prices (table 1). The erratic movements in net wheat trade (fig. 3) can be easily viewed as arising from domestic production variability. Wheat area harvested has been rising steadily from 1.7 million hectares in 1980 to 2.7 million hectares in 1990.

On the demand side, rising incomes and food subsidies spur consumption (fig. 4). The implicit Government assurance of adequate and affordable food supply is currently under question. In 1971, the Government started to intervene extensively in the food and agricultural markets as a result of political unrest. Now, budgetary pressures prevent the continuation of the old system. In the context of a poor land base, high rainfall variability, inhibited land and capital markets, a rapidly growing population, and low effective demand, Moroccan policymakers now wrestle with how to provide food security for the most vulnerable segments of society.

Government Intervention in Agriculture

The Moroccan Government's stated goals are to increase agricultural productivity, attain self-sufficiency in sugar, and promote agricultural exports (35). The Government consistently spends more on food subsidies than on operational subsidies for public enterprises that assist producers, indicating that guaranteed low food prices are the primary goal (table 2).

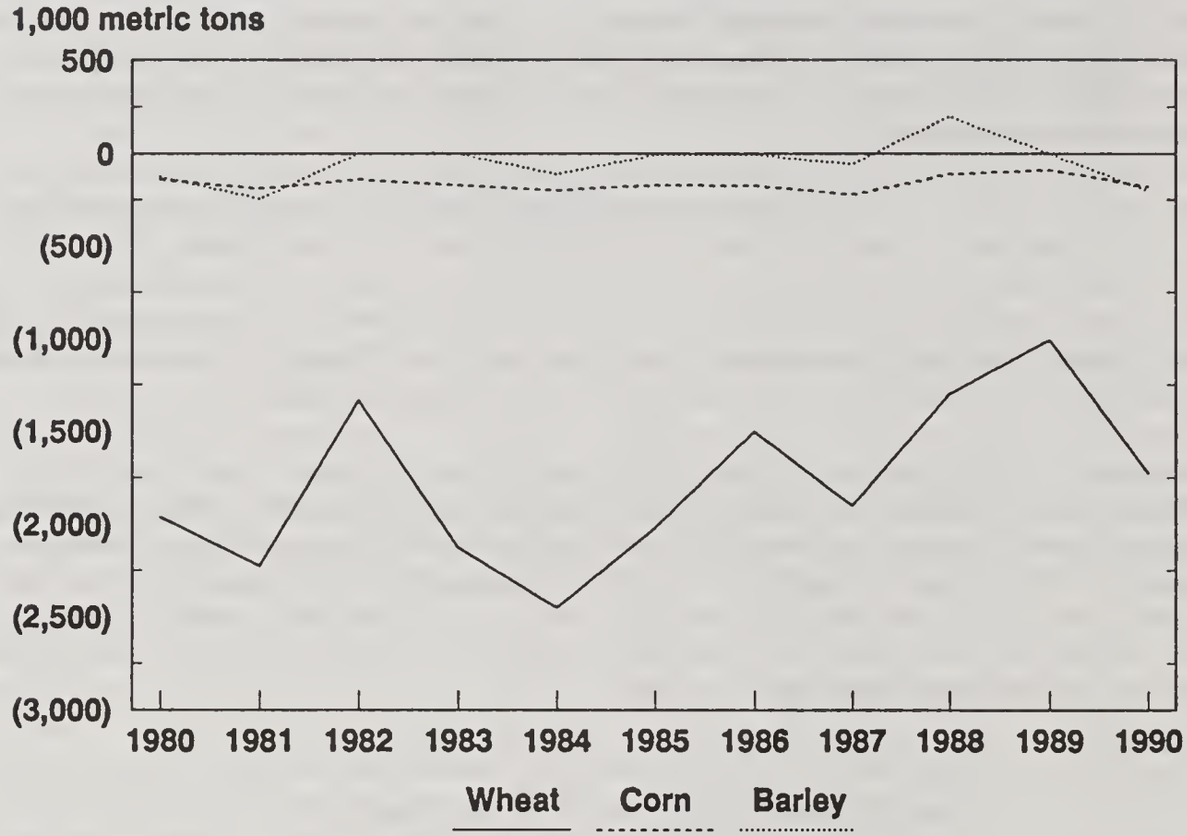
Table 1--Variability in key tradable prices and wheat production

Year	Phosphate rock price	Change	U.S. gulf wheat price	Change	Domestic wheat production	Change
	Dollars per metric ton	Percent	Dollars per metric ton	Percent	1,000 metric tons	Percent
1980	46.71	--	172.49	--	1,811	--
1981	49.50	6	174.88	1	892	-51
1982	42.38	-14	160.19	- 8	2,183	145
1983	36.92	-13	157.08	- 2	1,971	-10
1984	38.25	4	152.31	- 3	1,989	1
1985	33.92	-11	135.79	-11	2,050	3
1986	34.26	1	114.99	-15	3,809	86
1987	31.00	-10	112.79	- 2	2,427	-36
1988	36.00	16	145.12	29	4,019	66
1989	40.83	13	169.37	17	3,927	- 2
Mean annual percent change		1		1		22

-- = Not applicable.
Sources: IFS (5), and ERS (27).

Figure 3

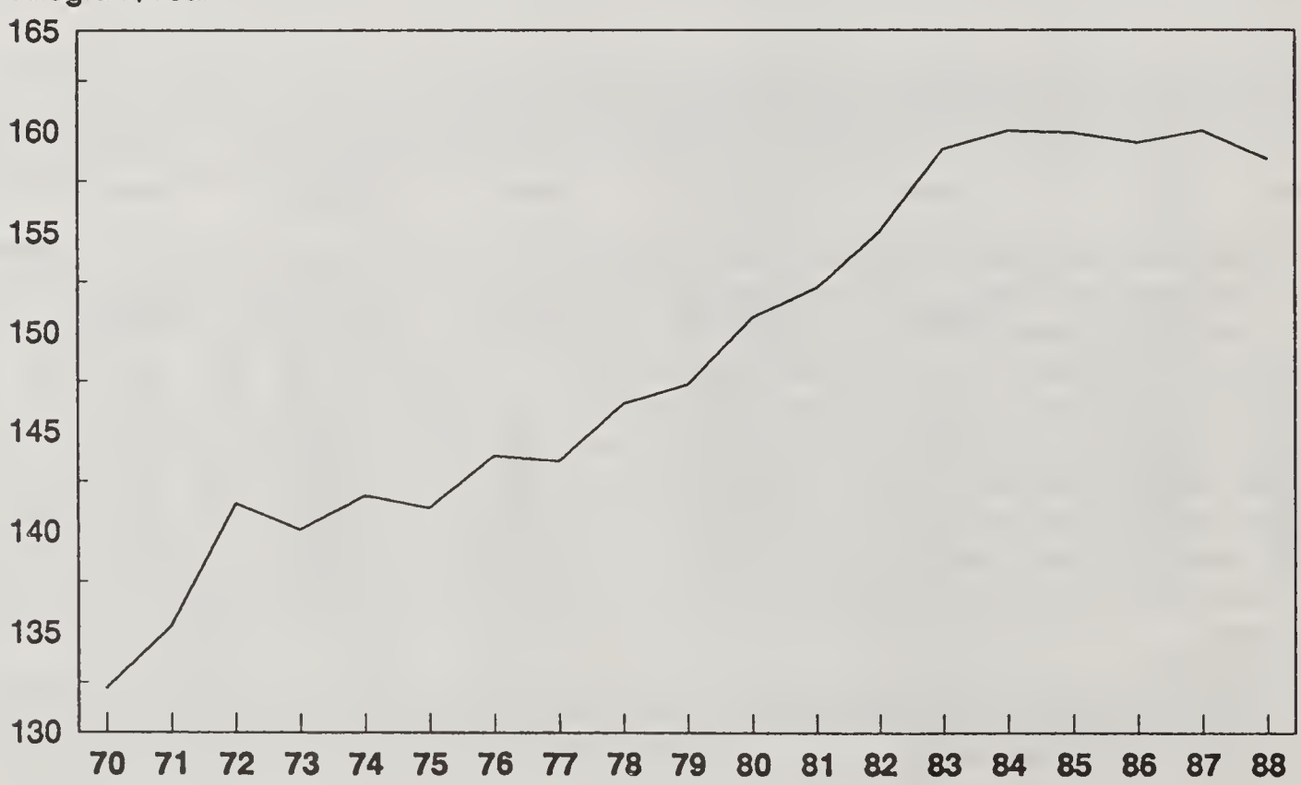
Moroccan net cereal trade



Source: Foreign Agricultural Service, U.S. Department of Agriculture.

Figure 4

Moroccan per capita wheat consumption



Source: U.N. Food and Agriculture Organization's Agrostat database.

Table 2--Moroccan subsidies by category

Category	1982	1983	1984	1985	1986	1987	1988	1989
				Million dirhams				
Operational subsidies to public enterprises	593	614	622	747	784	714	749	845
Capital subsidies to public enterprises	2,336	2,024	1,982	2,299	1,732	1,431	1,787	1,973
Consumer food subsidies	2,000	2,168	2,155	2,510	1,670	679	1,277	1,225

Source: IMF (6).

This cheap food policy reduces consumer price fluctuations; input subsidies lower the cost of production. Output pricing policies may increase supply, but in the context of poor infrastructure and high marketing costs typical in most developing countries, such a policy could increase consumer prices unnecessarily.

Morocco's dietary staples include wheat flour, sugar, barley, and vegetable oils. They account for 42 percent, 11 percent, 9 percent, and 8 percent, respectively, of Moroccan per capita caloric intake (21). Thus, the import and distribution of these goods are closely controlled through an interlocking panoply of public enterprises and variable levies (in the case of sugar) to control the domestic price.

Main Agricultural Policy Interventions

The Moroccan Government has intervened extensively in economic activity dating back to the French protectorate era. The main instruments in the agricultural sector have been: (1) marketing boards that set grain prices and monopolize imports; (2) input and service subsidies; (3) administrative controls and regulations that fix intermediaries' profit margins in the agro-processing/marketing chain; (4) consumption subsidies for basic foodstuffs (flour, sugar, and edible oils); and (5) foreign exchange overvaluation (6, 9, 16, 19, 35).

Since the early 1980's, the Government strategy has consisted of raising food prices, diminishing the state's role in the marketing of commodities, and reducing or eliminating subsidies on most inputs.

Channels of Intervention. Each year the Interministerial Pricing Committee, comprised of representatives from the Ministry of Agriculture and Agrarian Reform (MARA), the Ministry of Trade and Industry (MTI), the Ministry of Finance, the Ministry of Interior, and the Prime Minister's Office, set producer prices for selected commodities on a cost-plus basis (19). Consumer prices for flour, bread, refined sugar, vegetable oils, and dairy products are also set (table 3), but on a more irregular basis (19).

Marketing Controls. The National Cereals and Pulse Office (Office National Interprofessional des Céreales et Legumineuses, ONICL) is the Government monopoly responsible for grain imports and marketing. ONICL is charged with defending the guaranteed price for soft wheat, and until 1988/89, the minimum price for hard wheat and barley set by the Interministerial Pricing Committee.[3] In

[3]Soft wheat is used exclusively for making bread flour for lower-middle- and lower-class urban consumers, while hard wheat is largely consumed in rural areas and by the middle and upper classes in urban areas.

Table 3--Types of commodity interventions and reform status, 1982-89

Instrument	Commodity affected	Recent reforms
Producer price and marketing controls:		
Support price[1]	Soft wheat	Unchanged
	Sugar	Unchanged
	Cotton	Unchanged
Minimum price	Hard wheat	Liberalized in 1988
	Barley	Liberalized in 1988
	Corn	Liberalized in 1988
Trade monopoly[2]	Soft wheat	Unchanged
	Hard wheat	Unchanged
	Barley	Unchanged
	Corn	Unchanged
	Sugar (raw)	Unchanged
Consumer price controls:		
Administered price	Wheat flour	
	High-quality flour	Ceased in 1989
	Low-quality flour	Unchanged
	Vegetable oil	Unchanged
	Refined sugar	Unchanged
Input subsidies:		
Credit	All commodities	Increasing
Fertilizer	All commodities	Declining
Irrigation water	All except barley	Declining
Seed	All commodities	Declining

[1]Reference price linkages have been used to determine announced support price instead of cost-of-production markups for these three commodities since 1990. Full liberalization of sugar and cotton are expected in 1993.
[2]Grain trade and marketing liberalization studies are underway.

addition, ONICL licenses and distributes all imported grains to mills, directing the National Transportation Office (Office National des Transports, ONT) to move authorized allotments of grains from point of entry to authorized mills for a reimbursable fee. Licensed traders sell the imported grain to the mills at a subsidized price, and ONICL reimburses them the difference between the imported price and the subsidized price, plus maintenance costs and a fixed profit margin. When world prices are lower than the support price, traders reimburse ONICL the difference between the two prices, minus transportation and maintenance costs (9, 19).

Similarly, millers sell soft wheat flour to wholesalers and bakeries at a fixed transfer price and receive from ONICL the difference between the subsidized transfer price (trader-miller) and the miller-baker price (plus milling costs and a fixed profit margin). The wholesalers and bakeries then sell the flour at fixed prices to retail stores, which then sell to consumers at an official consumer price (9).

When the border price of imported grain is higher than the state trading price of grain, ONICL uses its reserves or seeks relief from the Stabilization Fund (Caisse de Compensation, CC), an agency responsible for distributing consumption subsidies to various other parastatals and private businesses responsible for the production and distribution of wheat flour and sugar.

Anomalies do exist in the marketing chain and sometimes lead to illegal transactions. Whereas the licensed traders and millers receive Government compensation for their processing costs, wholesalers, bakeries, and retailers do not. This differential treatment, combined with the free market price of soft wheat that is typically 20-40 percent below the support price, permits the existence of a parallel market. The price difference arises because many farmers cannot transport their grain to Government

collection points, and millers are prohibited from buying directly from producers. In addition, because of its small budgets, ONICL may not be able to defend support prices throughout the harvest season. Licensed traders are tempted to collect monopoly rents by buying soft wheat directly from farmers at a low price but claiming they bought it at the higher support price. In bad harvest years, enforcement becomes problematic. Wholesalers and retailers sell flour above the official rates, claiming that Government prices do not cover maintenance and profit margins as they do for millers and licensed traders (9).

The National Tea and Sugar Office (Office National du Thé et du Sucre, ONTS) plays for sugar a role similar to that of the ONICL. ONTS determines the level of sugar imports and uses variable levies to control the price of imported sugar. Raw sugar is sold to refiners at a fixed price set by the Stabilization Fund to cover production costs, a margin for return to capital, and a consumption excise tax. The sugar refineries then sell granulated sugar to wholesalers at a fixed price and are compensated for the difference between the Government-decreed "transfer" price and the wholesale price. Retailers then sell to consumers at fixed consumer prices (19).

The marketing and distribution of the other intervened commodities, edible oils and cotton, are roughly similar to soft wheat and sugar. The sugar, cotton, and edible oil markets are less prone to black-market activities because many processing plants are Government owned and operated. Government consumer pricing for sugar and edible oils is also better controlled because the population is concentrated in a few urban centers, which facilitates monitoring, and because supplies fluctuate less sharply.

Input Subsidies. The Ministry of Agriculture and Agrarian Reform (MARA) and other Government agencies subsidize seed, irrigation water, fertilizer, credit, equipment rental, and research and extension services. MARA is responsible for extension services mostly in dryland areas, while nine Regional Agricultural Development Offices (Offices Régionaux de la Mise en Valeur Agricole, ORMVA) are responsible for the technical and agronomic management of large-scale irrigation projects. The ORMVA determine crop rotation patterns, maintain water works, distribute seed and fertilizer, and provide extension services to farmers in the project perimeter (35).

A fertilizer agency (FERTIMA) monopolizes the import and sale of fertilizer and reimburses fertilizer producers for the difference between the actual manufacturing costs and the administratively set reference prices. All margins for transport, handling, blending, bagging, storage, and distribution are also fixed (19).

The national seed company (SONACOS) stabilizes the price and supply of selected seeds. However, the seed subsidy never amounts to a large budgetary outlay and the affected area is small. The Export Office (Office de Commercialisation et d'Exportation, OCE) monopolized the export of cash crops, mostly citrus, potatoes, tomatoes, and cut flowers, and generated revenue through surcharges until it was abolished in 1986 (19).

Lastly, the National Agricultural Credit Bank (Caisse Nationale de Crédit Agricole, CNCA) is a specialized credit institution that disburses low-interest loans to farmers and cooperatives (19). Agricultural loan interest rates are lower than commercial rates (6).

Recent Reforms and Impacts

Since the debt crisis in 1983, policy reforms have been strongly influenced by the International Monetary Fund (IMF) and the World Bank. In 1985, Morocco negotiated a $100-million agricultural structural adjustment program with the World Bank that had the following objectives:

(1) alter the price and marketing incentive framework to encourage optimal shifts in agricultural activities, while maintaining adequate incentives for the areas likely to be the primary sources of agricultural growth in the near term;

(2) strengthen yet rationalize Government agricultural support activities, emphasizing cost recovery;

(3) reallocate public investment to quick maturing, high-return investments and toward the rainfed sector; and

(4) strengthen the institutional capacity for agricultural policy planning and analysis (18, 35).

The Moroccan Government has followed through on three of the four objectives (table 4). Between 1985 and 1989, Government commercial service support activities were privatized, the number of imported agricultural commodities subjected to quota was greatly reduced, input subsidies were reduced, and irrigation water charges were increased at rates better than those stipulated in the loan agreement (6). Improved cost recovery allowed three of nine ORMVA's to become commercially viable (6). Seed and fertilizer distribution within the ORMVA's has been entirely privatized. The Institute for Agricultural Research and the Directorate of Planning and Economic Affairs (DPAE) underwent reorganization and staff upgrading. However, the irrigated sector continued to absorb most of the agricultural budget despite indications that rainfed agriculture has higher economic rates of return (19, 35). ONICL is slated to be either drastically reformed or abolished by 1993. Still, as of the end of 1991, the marketing channels remained basically the same. Since 1988/89, barley, corn, and hard wheat are no longer supported. Soft wheat support price has been linked to a moving average of international prices as opposed to the former cost-plus basis. In the case of sugar and cotton, the Interministerial Pricing Committee uses a 1988 base real price, minus 2 percent, but plans to completely liberalize these two commodities in 1993 (13).

Relative Importance of Interventions

Producer and consumer subsidy equivalents (PSE's and CSE's) are a useful quantitative measure of commodity protection or taxation. They summarize the effects of various policies pursued in any year as well as over time. Subsidy equivalents are the ratio of the sum of Government transfers or taxes over the total market value of a given commodity in 1 year. A positive PSE or CSE means that

Table 4--Impacts of first agricultural structural adjustment loan (1985)

Objective	Compliance
Change price incentives	Substantial changes in studied commodities.
Improve cost recovery	Substantial improvements. Large-scheme irrigation water user fees cover 70 percent of operational expenses, up from the 50-percent range in the early 1980's.
Shift public investment to dryland sector	Unsuccessful.
Improve research and analytical capabilities	Significant increase in the number of public service personnel trained in advanced economics, statistics, and life sciences.

the sum of all Government intervention is greater than the taxes, and the producer or consumer benefits. A negative PSE or CSE means that the producer or consumer is being taxed or is forgoing value.

In this study, PSE's were calculated for wheat, barley, corn, cotton lint, and raw sugar, and CSE's for wheat flour, refined sugar, and edible vegetable oils. The cereals are produced mainly by the small-farm sector, while sugar is an import substitute. These commodities constitute more than 60 percent of value added in Moroccan agriculture. Livestock and high-value export crops (such as citrus, tomatoes, grapes, dates, potatoes, fish, and shellfish) were not included because of insufficient data. The foodstuffs covered account for most of per capita caloric intake.

Measured policies include: the marketing board, which combines the effects of price supports and State trading restrictions on imports; input subsidies; transportation assistance on imported grain; irrigation water and capital subsidies; and currency overvaluation. For lack of sufficiently disaggregated data, unmeasured input assistance policies include infrastructure, seed, extension service, and electricity. In addition, the implicit subsidies and transfers from other sectors stemming from such factors as marketing taxes, credit defaults, and tax exemptions for agricultural income were not captured.

The PSE's and CSE's, which are aggregate measures, mask the income distribution effects of intervention. For example, there are clear differences in the distribution of subsidies. Irrigated farms receive an estimated 70-percent share of input subsidies (18). This reflects the Government's commitment to spur the development of modern agriculture in nine high-potential, large-scale irrigated areas.

Aggregate Effects for Producers

The Moroccan Government, which modestly supported its agricultural producers in 1982, had completely withdrawn by 1989. Transfers averaged DH40 million ($4.8 million) per year during 1982-89, or 3.6 percent of the value of production. In 1983, 1988, and 1989, the five-crop aggregate PSE turned negative (fig. 5, table 5).

The negative levels of support can be explained by movements in exchange rates, international reference prices, and policy reform. In 1983, support declined precipitously from the previous year, as the implicit taxes associated with an overvalued exchange rate and sharp movements in international reference price overwhelmed the positive transfers of the marketing board and credit subsidies. Poor rainfall in 1983 resulted in a 10-percent drop in wheat production and a 47-percent decline in barley output. This, combined with a high international sugar reference price, lowered the marketing board transfers by 64 percent from the previous year.

Positive policy transfers peaked in 1986/87 and then declined dramatically by 1989 as economic reforms accelerated. In 1988 and 1989, the removal of price supports for corn and barley allowed currency overvaluation and fertilizer price liberalization to turn the aggregate PSE measure negative. Marketing board support fell 44 percent and credit subsidies declined 11 percent between 1986 and 1989. Fertilizer subsidies were positive in earlier years but became negative in 1986.

Sharper rises in local prices (146 percent) for nitrogen-based fertilizer compared with changes in the reference price (21 percent) explain the switch in signs from 1982-89. This development is consistent with the conditions of the World Bank's Agricultural Structural Adjustment Loans of 1985 and 1987. The two taxing policies, exchange rate overvaluation and import transport assistance, increased in value; overvaluation taxed producers 250 percent more in 1989 than in 1982. Equilibrium exchange rate calculations, however, are very sensitive to choice of base year and technique used.

Figure 5
Morocco's aggregate PSE's
Percent

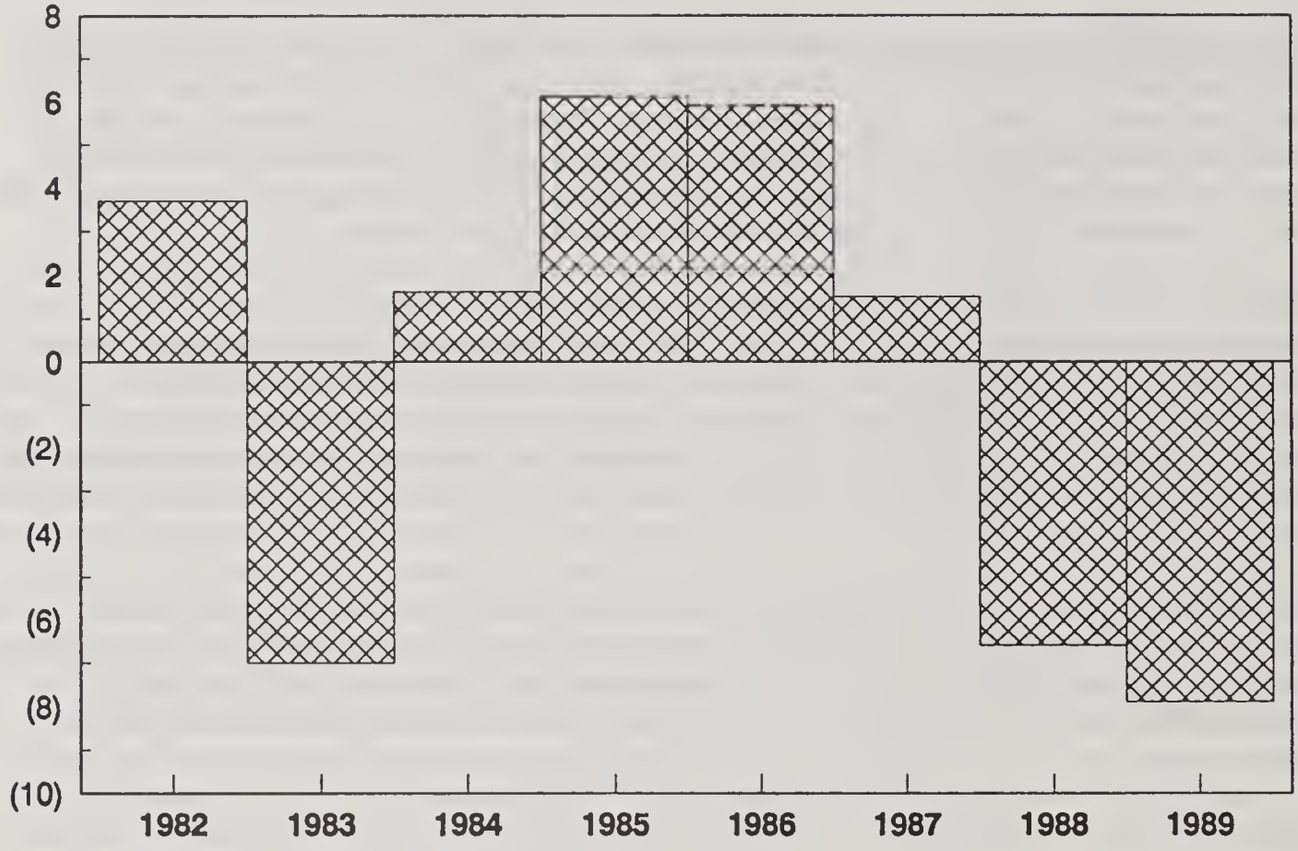


Table 5--Moroccan producer subsidy equivalents

Item	1982	1983	1984	1985	1986	1987	1988	1989
					Percent			
PSE by crop:								
Wheat	8.0	-3.1	2.0	-0.7	5.2	3.6	1.7	-2.0
Corn	4.3	-1.3	12.1	16.5	15.8	7.8	-20.0	-14.8
Barley	0	-10.9	-4.2	9.1	4.6	-1.8	-23.0	-18.4
Cotton lint	43.9	7.3	46.0	58.7	66.6	33.7	48.8	34.7
Sugar	-66.1	-147.3	31.2	89.5	-24.0	-85.6	-192.3	-174.8
Five-crop aggregate	3.7	-7.0	1.6	6.1	5.9	1.5	-6.6	-7.9
					Million dirhams			
Transfers by instrument:								
Marketing board	456.92	166.27	149.10	448.03	1,798.91	1,035.87	1,026.16	992.20
Fertilizer	139.17	-14.81	321.54	198.87	-70.11	-208.89	-95.16	-325.27
Credit subsidy	36.30	22.99	17.79	37.59	84.63	73.61	72.51	75.69
Foreign exchange	-487.99	-530.35	-467.59	-224.91	-974.53	-796.09	-1,724.30	-1,705.26
Irrigation subsidies	131.87	133.25	155.54	139.69	168.28	148.89	169.16	179.39
Transport subsidy	-27.01	-86.14	-90.03	-109.24	-207.01	-120.49	-213.27	-220.07
Transfers by crop:								
Wheat	243.62	-86.85	58.28	-30.30	393.51	173.65	135.09	-172.29
Corn	10.55	-4.36	51.15	95.32	87.45	33.57	-97.47	-51.67
Barley	0.64	-124.55	-76.01	264.16	235.31	-55.52	-629.91	-613.01
Cotton lint	30.99	6.68	30.17	84.73	104.81	72.95	86.36	64,54
Sugar	-36.55	-99.71	22.77	76.13	-20.91	-91.75	-258.97	-230.90
Total policy transfers	249	-309	86	490	800	133	-765	-1,003
Value to producers	6,735	4,396	5,345	7,970	13,525	8,648	11,578	12,632

In general, the price and procurement system was ineffective, especially in stimulating higher cereal production, because only a fraction of soft wheat and other major grains were ever purchased. Support price policies never reached most grain producers because of a combination of factors: limited own transport for small farmers; few Government purchasing sites; producer failure to meet quality standards; and marketing board budget and handling constraints. As a result, cereal output was lower than it could have been.

Aggregate Effects for Consumers

The Moroccan Government heavily subsidized wheat and sugar consumption, transferring a net average of DH725 million ($87 million) per year or 16 percent of total cost. The three-commodity aggregate CSE fluctuated, with peaks in 1984 and 1989 and troughs in 1987 and 1988 (fig. 6). The upswings coincided with sharp divergences between the international reference price and local prices. For example, the import unit value of wheat flour jumped 46 percent in 1984 and 70 percent in 1989, while domestic prices increased 15 percent in 1984 and declined 9 percent in 1989 (table 6).

Currency overvaluation succeeded in transferring much more value to consumers, an annual average of DH1.07 billion ($130 million) compared with a negative DH206 million ($25 million) for price intervention. The Moroccan Government began to intervene selectively in 1989, when the price of high-quality flour was not subsidized. The lower quality flour distributed in the country is an inferior good more readily purchased by the poor while the higher quality flour is consumed more by the affluent urban middle and upper classes (9). This change reflects an attempt by the Government to better control budgetary outlays, yet meet equity goals.

Figure 6
Morocco's aggregate CSE's

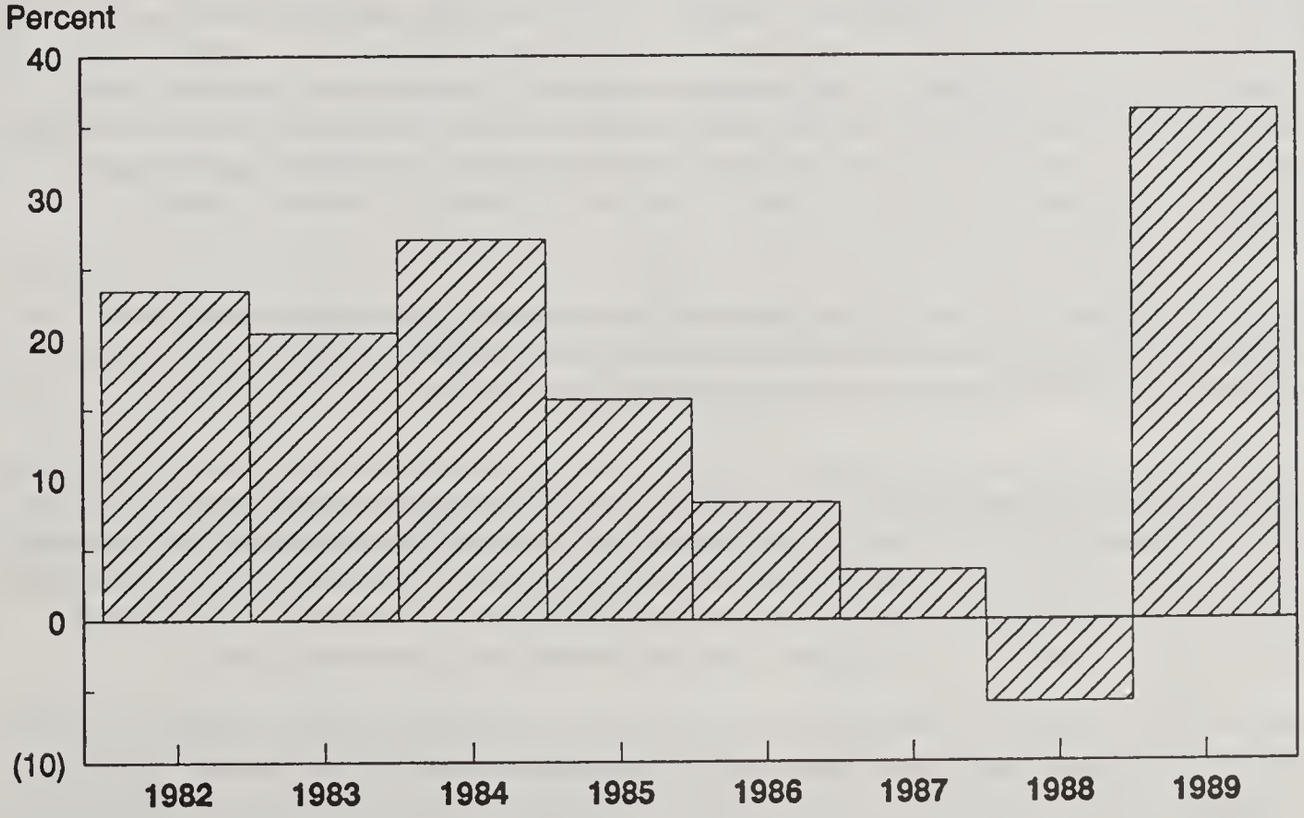


Table 6--Moroccan consumer subsidy equivalents

Item	1982	1983	1984	1985	1986	1987	1988	1989
				Percent				
CSE by commodity:								
Sugar	-45.38	-43.67	-56.89	-65.75	-54.30	-48.15	-24.42	-10.06
Wheat flour	86.15	82.18	148.04	92.18	65.80	45.96	13.96	199.26
Vegetable oil	32.52	36.81	42.97	33.45	32.31	29.90	32.60	40.08
Three-commodity aggregate	23.44	20.41	27.00	15.69	8.31	3.49	-5.88	36.15
				Million dirhams				
Transfers by instrument:								
Foreign exchange	850.16	1,111.86	743.33	-359.11	1,229.72	1.540.03	1,567.47	1,947.75
Price subsidy	104.56	-173.67	311.03	1,161.77	-727.09	1,333.18	1,892.91	-277.76
Transfers by commodity:								
Sugar	-880.89	-984.82	-1,311.73	-1,628.50	-1,570.83	-1,289.24	-698.52	-298.65
Wheat flour	1,835.28	1,922.47	2,365.29	2,430.49	2,072.88	1,495.61	372.49	1,967.79
Vegetable oil	0.33	0.53	0.81	0.67	0.58	0.48	0.59	0.85
Total transfers to consumers	954.72	938.19	1,054.36	802.66	502.63	206.85	-325.45	1,669.99
Cost to consumers	4,072.56	4,595.94	3,905.23	5,115.62	6,044.91	5,933.49	5,530.25	4,620.21

Producer Effects By Commodity

From 1982-89, two patterns are discernible. Wheat, corn, and cotton were generally supported but at a decreasing rate. The peak support in 1985-86 coincided with the start of the World Bank's mandated reform program. Barley was sporadically supported and sugar was taxed at increasingly high levels (app. II, fig. 7).

Wheat. Wheat was modestly supported at an average of 2 percent per year from 1982-89 (app. II). In 1988 and 1989, when hard wheat was liberalized, the level of support dropped substantially. From the perspective of policymakers, soft or bread wheat is the most strategic grain. While soft wheat on average accounts for 45 percent of total wheat production, it accounted for 90 percent of ONICL wheat purchases from 1982-87, and 100 percent in 1988-89. Thus, soft wheat producers continued to benefit from rising official prices and irrigation and credit subsidies. Imported grain transport assistance, an overvalued exchange rate, and cuts in fertilizer subsidies, however, offset the aforementioned supports.

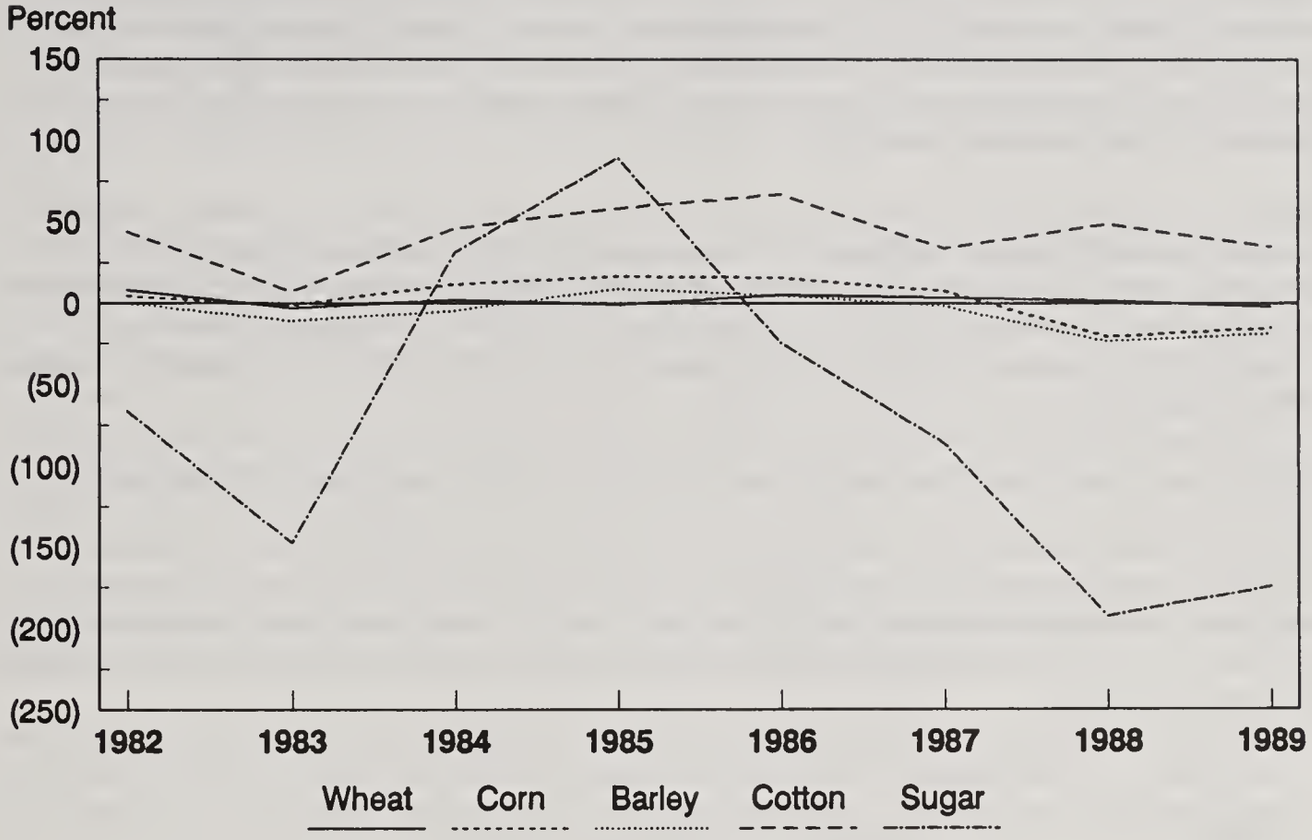
Sugar. Sugar was taxed from 1982-89 except for 1984 and 1985, when a massive drop in the international reference price and currency devaluation yielded positive support (app. II). Over the entire period, the average tax was 101 percent of producer value.

Since 1963, the Government has focused on sugar for an import substitution program, protecting the local industry through import quotas and variable levies, and channeling subsidies toward the sugar industry. The true effect of domestic pricing policy can be assessed by studying the PSE's without the currency overvaluation tax policy. Since sugar is not exported, there is no direct producer effect from currency overvaluation taxation. The only producer effects are indirect ones on choice of technique arising from the relative prices of imported versus locally produced inputs.

Thus, if indirect effects are considered minor and the overvaluation effect were removed, sugar would emerge as a supported commodity with an adjusted average annual PSE of 24 percent. The only year of nonsupport, as measured by the adjusted PSE, occurred in 1983 and was due to a higher than average international reference price. Most of the adjusted PSE support stemmed from the large gap

Figure 7

Commodity PSE's



between local prices and the world reference prices.[4] Over time, the amount of internal support declined from a high of 46 percent in 1984 to 32 percent in 1989 as the wedge between official producer prices and the weighted farmgate border equivalent price moderated.

Corn. Before 1988, corn was supported at an average annual PSE of 9.2 percent (app. II). The main support instruments were irrigation subsidies and marketing board intervention. Corn is a minor crop, and represents only 2 percent of total agricultural value.

Barley. Barley is the most widely grown crop in Morocco because of its drought resistance. Still, it is a marginally traded commodity. Most barley is consumed on the farm by both humans and animals. Government support for barley prior to 1988 was negative, with an average PSE of -5.5 percent (app. II). Despite official support prices, very little barley was marketed through Government channels. If exchange rate overvaluation were excluded, the average annual PSE for 1982-87 would be 5.4 percent.

Cotton. Cotton lint production in Morocco is low compared with other African producers. Yet, the Government consistently supported cotton with an average annual PSE of 43 percent (app. II). Most of the support was provided through marketing board intervention.

[4]Most sugar in the world is traded under quota systems. The Caribbean price quote and the one used here is the residual market price for production in excess of quota allowances. It is the most market-determined price but it is still probably lower than would be expected in a complete market. Econometrically modeled sugar prices would be the ideal reference price.

Consumer Effects by Commodity

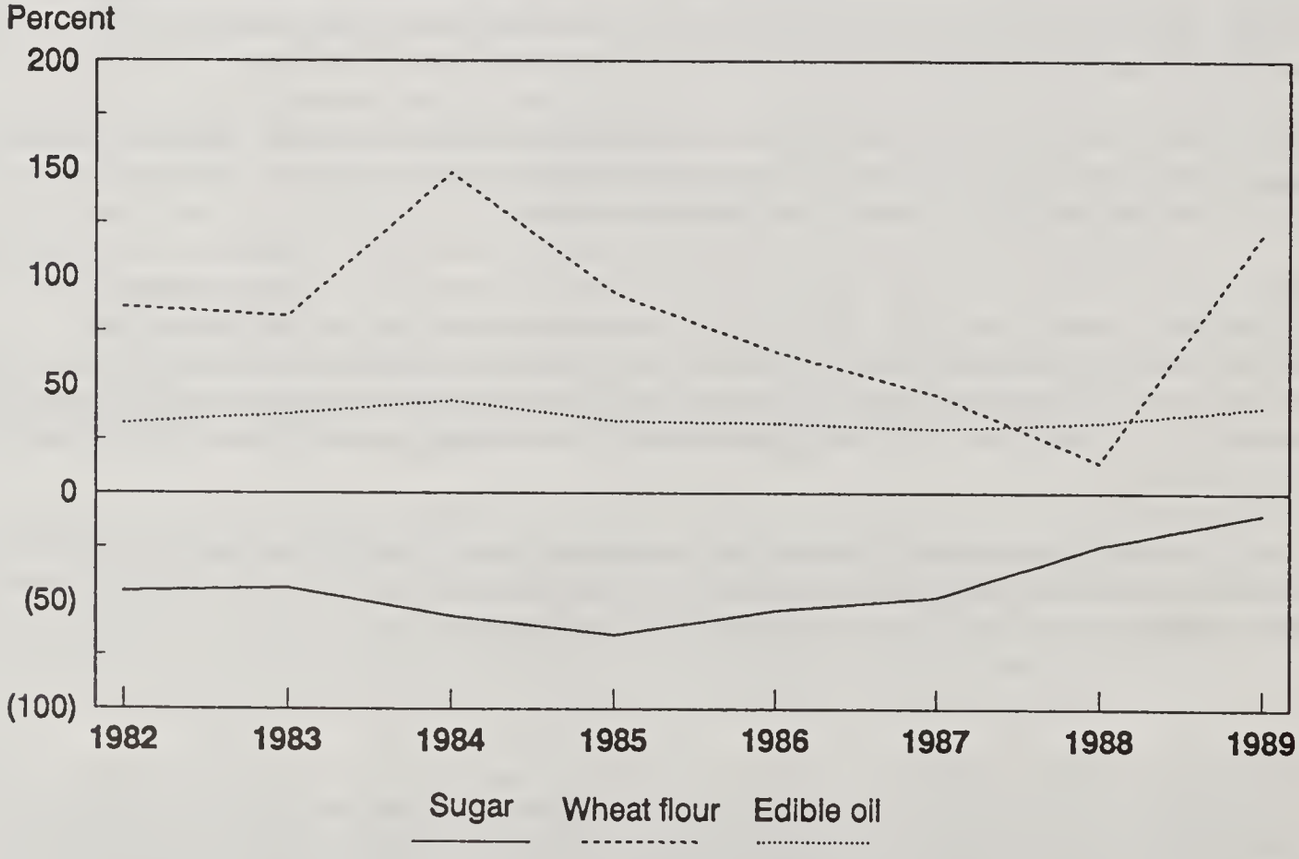
Wheat flour and refined sugar CSE's fluctuated from 1982-89 while edible vegetable oil CSE's remained virtually constant (fig. 8). Variations in the flour and sugar CSE's were due mostly to sharp movements in international reference prices. Consumer prices have remained remarkably steady for sugar and vegetable oil, but dropped in 1989 for wheat flour because of the removal of high-quality flour from the subsidy list.

Sugar. The sugar CSE had an annual average tax of 43 percent (app. III). The internal sugar retail price was reportedly below refining cost, but compared with the international reference price, Moroccan consumers were penalized (6). The quantity subsidized increased 20 percent, the domestic price 26 percent, and the reference price 98 percent from 1982-89. Because per capita sugar consumption is very high, an estimated 31 kg/person per year, policymakers are reluctant to institute radical changes (21).

Flour. The annual average flour support was 81 percent; the CSE trended upward but dipped in 1986-88 (app. III). In those years, sharp drops in import unit values explained the declines in CSE's.

Edible Oil. The annual average edible vegetable oil CSE was 35 percent, but the actual transfers were small, averaging DH600,000 ($73,000) a year (table 6). While retail prices changed sharply in 1982-84, they remained unchanged since 1986. The level of consumption, however, rose throughout the period (app. III).

Figure 8
Commodity CSE's



Contribution to Policy Objectives

The Government of Morocco has multiple goals in the agricultural sector. First, it seeks to improve overall productivity. Second, it seeks to reduce import dependence for sugar and wheat (35). Third, it seeks to provide cheap food primarily for the urban population. And fourth, it seeks to promote export crops. Compliance with the first three goals has been fair to good. The fourth objective cannot be substantiated in this report because growth rates, or PSE's, were not calculated for export crops.

The Government's success in improving productivity has been mixed for the studied commodities. Yields over the past 20 years suggest that only wheat improved dramatically, from an annual average 0.99 metric tons per hectare in the 1970's to 1.23 metric tons in the 1980's. Two of the three industrial commodities--sugarbeet and sugarcane--improved markedly, while cotton showed a slight upward movement (table 7). The same results held when the 1982-89 period was compared with the preceding 8-year period, 1974-81. Higher standard deviations were recorded for the predominantly rainfed crops (wheat, barley, corn, and sugarcane) than for the irrigated ones, cotton and sugarbeets.

The Governmnet's goal of reducing import dependence on sugar and wheat has been more successful (fig. 9). Import dependence for both commodities fell from the 50-percent range in the mid-1970's to the 20- to 40-percent range a decade later. Sugar production rose 73 percent between 1975 and 1990, but high per capita demand keeps sugar import dependence higher than wheat.[5]

Finally, the objective of providing cheap food has been satisfied as indicated by the low rate of food price inflation, broad enforcement of fixed prices, and the large and positive CSE's for wheat flour and edible oils (9). Although consumers are taxed (compared with the international sugar reference price), retail prices are lower than the real cost of domestic refining (9).

Table 8 illustrates that the annual percentage changes in the three strategic food commodities were, on average, less than the annual percentage change in the cost of living index.

Liberalization Possibilities and Issues

In September 1986, the member nations of GATT met in Punta del Este, Uruguay, for the eighth round of multilateral trade negotiations aimed at reducing distortions in world trade in general, and agriculture in particular. The talks extended beyond the December 1990 deadline because of a stalemate between the EC and the Cairns Group of exporters. The EC seeks to defend its high level of protection for its producers while other leading exporting nations, including the United States, seek to substantially reduce Government intervention in agriculture. The results of these talks could have a direct bearing on the nature of Moroccan Government intervention, the size of the grain import bill, and food security. A successful agreement could extend and quicken the pace of unilateral reforms.

In the Uruguay Round, Morocco joined forces with other net food importers--specifically Egypt, Jamaica, Mexico, and Peru--in voicing concern over food security in light of expected increases in grain prices under liberalization scenarios.[6] The importers emphasized the need for a multilateral

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[5]Sugar has negative PSE values but an upward production trend. This apparent discrepancy can be explained by focusing on the components of the commodity PSE. Sugar is a protected crop, where the producer price is higher than the international imputed farmgate reference price. There is positive producer incentive in most years. However, the large negative foreign exchange effect swamps the modest positive marketing board intervention.

[6]Morocco became a member of the GATT in June 1987.

commitment that includes: (1) improved market access; (2) increased food aid and flexibility in structural adjustment loans to ease the cost of internal reforms; and (3) increased developmental aid directed at agriculture (2).

According to Moroccan sources, Morocco may be amenable to a tradeoff, accepting higher grain prices for unrestricted access to EC markets for their manufactures and high-value agricultural produce (6). The EC, faced with the daunting task of economic integration in 1992, the reunification of Germany, and the assistance of emerging market economies in Eastern Europe, may not be willing to grant full access in the near term (10). Thus, what is politically feasible, combined with strong competition from other Mediterranean Basin countries for European markets, may be one of the obstacles to economic restructuring and growth in Morocco.

The World Bank structural adjustment programs have already shifted production patterns and factor returns. GATT-induced liberalization of global trade would accelerate the reform program and spell additional uncertainties. The results of such a liberalization depend on how it is implemented. If the speed of adjustment is too fast or unsynchronized with the design and establishment of a new food security system, social unrest is likely, and retreat from economic reform could occur.

Reducing producer support for a staple like soft wheat may lower farm incomes and encourage rural-urban migration if profitable alternatives are not readily available. It probably would also lead to

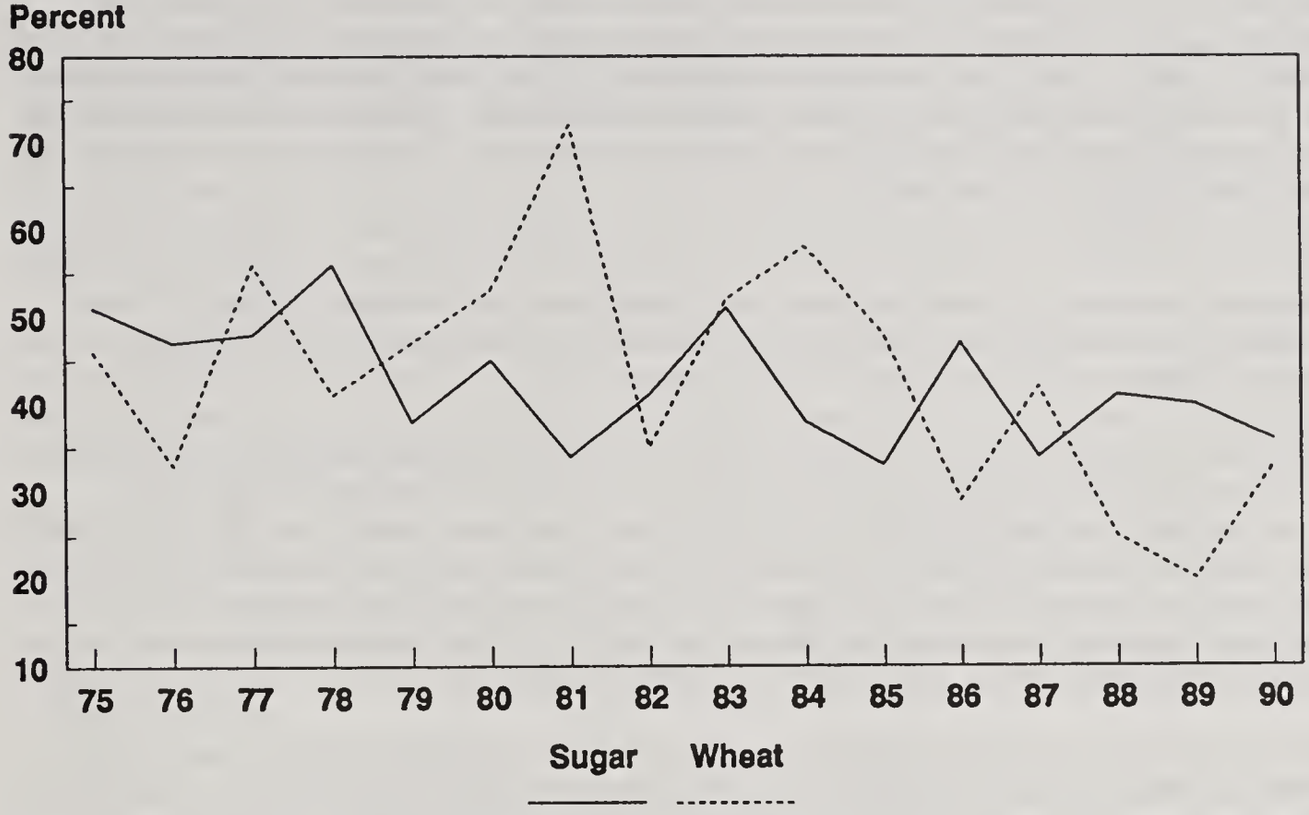
Table 7--Selected crop yields in Morocco

Year	Barley	Corn	Wheat	Cotton	Sugarbeet	Sugarcane
			Metric tons/hectare			
1970	0.87	0.65	0.96	0.31	31.82	NA
1971	1.02	.81	1.16	.47	36.83	NA
1972	1.09	.81	1.05	.49	27.95	NA
1973	.62	.49	.77	.36	28.73	NA
1974	1.21	.87	.97	.37	33.52	NA
1975	1.56	.75	.93	.23	28.90	15.75
1976	1.35	1.14	1.14	.36	35.25	39.00
1977	.58	.43	.67	.33	30.70	44.25
1978	.97	.99	1.07	.34	40.59	67.60
1979	.87	.75	1.08	.60	34.52	73.25
1980	1.03	.81	1.06	.54	35.57	93.75
1981	.47	.25	.54	.63	36.96	88.85
1982	1.14	.62	1.29	.55	40.59	63.75
1983	.57	.59	1.00	.59	39.27	81.66
1984	.66	.69	1.07	.48	47.64	70.45
1985	.93	.80	1.08	.59	40.08	55.38
1986	1.44	.82	1.71	.59	48.09	66.00
1987	.67	.65	1.06	.74	45.08	65.23
1988	1.38	.90	1.73	.51	49.01	73.00
1989	1.25	.99	1.49	.64	45.29	65.73
1990	.89	1.16	1.33	.52	46.53	72.80
Average 1970-80	1.02	.77	.99	.40	33.13	55.60
Average 1981-90	.94	.75	1.23	.58	43.85	70.29
Std. dev. 1970-80	.28	.19	.14	.11	3.74	25.51
Std. dev. 1981-90	.33	.24	.34	.07	4.04	9.04
Average 1974-81	1.01	.75	.93	.43	34.50	60.35
Average 1982-89	1.01	.76	1.30	.59	44.38	67.65
Std. dev. 1974-81	.35	.27	.20	.14	3.38	26.32
Std. dev. 1982-89	.32	.13	.28	.07	3.64	7.17

NA = Not available.
Sources: ERS (27) and FAO (21).

Figure 9

Moroccan import dependence ratios



Source: Foreign Agricultural Service, U.S. Department of Agriculture.

Table 8--Retail consumer prices

Year	Flour		Sugar		Vegetable oil		Cost of living index[1]	
	DH/ton	Percent change	DH/ton	Percent change	DH/liter	Percent change	Index	Percent change
1982	1,268	--	3,236	--	4.6	--	260.0	--
1983	1,363	7	3,638	12	6.0	30	276.1	6
1984	1,379	1	3,654	0	6.0	0	310.5	12
1985	1,476	7	3,811	4	6.3	5	334.5	8
1986	1,727	17	4,169	9	7.0	11	363.8	29
1987	1,727	0	4,120	-1	7.0	0	373.6	3
1988	1,744	1	4,086	-1	7.0	0	382.4	2
1989	1,650	-5	4,094	0	7.0	0	394.3	3
Mean	--	4	--	3	--	7	--	9

-- = Not applicable.
[1]Base period--May 1971 to April 1973 = 100
Sources: ERS (27), and IMF (5).

higher import grain bills.[7] Such a policy change would likely raise concerns about distributional impacts, employment generation, and grain import capacity. Horticultural production is profitable but it is best suited to the more water-abundant, coastal strip. In addition, further improvements in export marketing and transport networks would be critical in an accelerated shift toward more horticultural production (13). Urban unemployment is already high (officially 16 percent in 1989) and while overseas emigration has increased in recent years, with the number of expatriate Moroccans surpassing 1 million, there may be limits to future emigration (6). West European Governments fear labor inundations from both the Arab world and Eastern Europe (3). Moves to limit immigration are already afoot in France and Germany. Immigration restrictions would reduce employment options for Moroccans during the transition period.

The prospect of higher international grain prices would place greater emphasis on generating foreign exchange and access to an international safety net of emergency food assistance in years of export shortfalls and droughts. Other major concerns include export market access and direct foreign investment flows.

In 1989, the EC accounted for 55 percent of Morocco's imports and 65 percent of its exports (21, 27). Historical ties and geographical proximity make France Morocco's prime trading partner, followed by Spain, Italy, and Germany. While Morocco's exports increased in the 1980's, they still face a number of EC trade barriers. The bulk of Morocco's agricultural exports, which account for 25 percent of total exports, are subject to quantitative restrictions, tariffs, and minimum import reference prices under the Cooperation Agreement of 1988 (6). These exports include citrus fruit, other fresh and prepared fruits, fresh flowers, fish, and wine (21).

Exports of textiles and clothing constitute 10 percent of Morocco's exports and have great growth potential. These exports are also subject to an EC voluntary restraint agreement, renewed in 1990, that sets yearly quotas but also sets higher barriers for other non-EC countries. In the event of multilateral liberalization, Moroccan fruits, vegetables, and textile exporters will probably have to compete fiercely with other Mediterranean Basin and East Asian producers for the EC market.

Liberalization Scenarios

Government support for agriculture can be reduced three ways: (1) complete liberalization, meaning the removal of all subsidizing and taxing policies affecting producers (setting all PSE's and CSE's to zero); (2) reducing positive net aggregate support (reducing all positive aggregate PSE's); and (3) reducing all instances of positive support (reducing all positive commodity PSE's).

The framework used to evaluate the liberalization effects for Morocco is the USDA-ERS Static World Policy Simulation (SWOPSIM) model, initialized with 1986 price and quantity data and containing 35 regions/countries and 22 commodities (7). The model offers counterfactual experiments in which each reform scenario is considered by replacing 1986 data with data from an alternative policy regime. The simulation generates different levels of production, prices, and trade than were experienced in the base year. The difference between the actual experience and the simulation is attributed to the policy changes.

Moroccan producer and consumer prices for 1989 are compared with the world reference price and then to simulated percentage changes in world prices stemming from global liberalization estimated in

[7]Most trade liberalization studies claim that international grain prices will be higher than current levels.

the ERS studies.[8] The singular and combined percentage differences indicate directions of welfare change.

Complete Liberalization

With full liberalization, all countries would remove all policies that affect producer revenue for all agricultural commodities. While economically rational, full liberalization is not politically feasible because of vested interests and government concerns with revenue generation and equity. Governments that support their farmers will likely face opposition from farmers and farm lobby groups. Governments that tax farmers will be hard pressed to replace lost revenues. In developing economies particularly, governments find it easier to collect export taxes than indirect sales or income taxes.

Full liberalization could also increase price variability if policymakers are unable or unwilling to insulate consumers. Given Morocco's tight budget and the commitment to liberalize tariffs and lessen other trade restrictions under the structural adjustment program, it is likely that higher international prices will pass through to consumers.

Price Effects. In 1989, wheat, corn, barley, and sugar had negative PSE's, while cotton had a positive PSE. To assess the effect of a unilateral liberalization on producer prices in Morocco, one must first consider what would happen if Morocco removed all market price intervention, while global prices remained unchanged. In this case, the prices for soft wheat would drop by 26 percent, cotton by 31 percent, and sugar by 42 percent. Barley and corn prices, already liberalized, would be unchanged (table 9).

According to an ERS simulation study, if other GATT members liberalized as well, world prices would rise (8). Assuming full transmission of price effects, or in practical terms, the absence of state trading boards, wheat prices would decline by 6 percent, cotton by 27 percent, and sugar by 2 percent (table 9). Barley and corn producer prices would rise 15 and 23 percent, respectively.

On the consumer side, in the absence of world price changes under full liberalization, sugar prices would fall by 25 percent and flour and vegetable oil prices would rise by 29 and 25 percent, respectively. If global liberalization is assumed, all the commodities show net price increases (table 10).

Output Effects. Assuming global liberalization, the price increases for barley and corn should, theoretically, stimulate output of these commodities. Simultaneously, output of wheat, sugar, and cotton would be depressed. Cropping patterns would be expected to shift according to the relative profitability, water availability, input delivery, and marketing possibilities of these crops.

Consumption Effects. Because the demand for the staple foods studied is inelastic, the price increases expected under both domestic and world liberalization scenarios would lead to only a moderate decrease in consumption (9). The changes would adversely affect the poor since food expenditures constitute the largest share of their budgets.

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[8]In published ERS SWOPSIM models, Morocco is subsumed in a regional North Africa/Middle East non-oil exporting bloc. Only large trading countries warrant individual country submodels. Small traders are assumed to be price traders, especially for cereals and other temperate commodities. Therefore, the investment needed to build a country model is not warranted. For this analysis, the global price results are assumed valid and constant for a short time interval, and the 1989 Morocco prices are simply compared with them.

Table 9--Producer price changes with liberalization[1]

Commodities	(A) 1989 base price	(B) Liberalized price (unilateral)	(C=B-A)/A) Change	(D) Expected world change (global)	(E=C+D) Net change
	-----DH/metric ton-----		----------Percent----------		
Barley	1,109	1,109	0	15	15
Corn	867	867	0	23	23
Cotton lint	20,656	14,213	-31	4	-27
Sugar	217	125	-42	40	-2
Wheat (soft)	2,200	1,618	-26	20	-6

[1]Assuming price transmission elasticity of one.
Source: (8).

Table 10--Consumer price changes with liberalization[1]

Commodities	(A) 1989 base price	(B) Liberalized price (unilateral)	(C=B-A)/A) Change	(D) Expected world change (global)	(E=C+D) Net change
	-----DH/metric ton-----		----------Percent----------		
Sugar	4,094	3,036	-25	40	15
Wheat flour	1,650	2,139	29	20	49
Edible oil	7[2]	8.79[2]	25	8	33

[1]Assuming price transmission elasticity of one.
[2]DH/liter.
Source: (8, p. 13).

The lower cotton lint prices should generate more demand for local cotton. Whether the response materializes depends on the relative profitability of local cotton and its quality competitiveness with foreign cotton.

Reducing Positive Net Aggregate Support

The effects of all measured policies on all covered commodities would be summed for each country and, if found positive, the GATT member country would reduce support by a certain percentage over a specified time. If the PSE calculations found in table 2 were used to determine Morocco's level of support and 1989 were used as the base year, Morocco would not have to act since its aggregate PSE is -8 percent. However, Morocco, as a net food importer, would face higher import prices as a result of reduced support by the leading agricultural exporters (8). Wheat, sugar, milk, and meat import prices would be most affected.

Reducing All Instances of Positive Support

Each commodity with positive support would be targeted for subsidy reduction or elimination. In the case of Morocco, using 1989 as a base, cotton policies would be scrutinized since they have positive PSE's.

Input Subsidies. Morocco is already committed to reducing most input subsidies. By 1989, fertilizer subsidies were eliminated but credit subsidies persisted. Other possible input interventions (seed, electricity, pesticides) were not quantified, but, in the context of budget austerity, most are likely to be reduced. The rationale for cheap credit is that it is an incentive for small farmers to accept higher

risk by adopting higher yielding varieties and modernizing cultivation. Fertilizer use rose about 40 percent from 1982-89, and its benefit has been well established (35).

Two areas where the Government may be reluctant to reduce subsidies are irrigation investment and research and extension. Given the irregularity of rainfall, the strong population pressure, the many rural poor, and the urgency of generating foreign exchange, Morocco, as well as other countries, may press for an exemption on this account, claiming these inputs as public goods.

Price Supports. The analysis indicates positive price support for sugar, wheat, and cotton producers in 1989. Liberalization would hurt producers of these commodities, who might change cropping patterns. The Government would also lose revenue from implicit variable levies on the imported, regulated commodities.

Constraints to Liberalization

The promise of liberalization is efficiency gains. However, political pressures and poorly functioning markets may impede full liberalization.

Fears of Political Instability

With full integration into the global market and complete price linkage, food inflation and/or price instability is likely for Morocco. Moroccan policymakers have managed to keep the fluctuation in consumer food prices lower than international food prices (19). They are averse to policy shifts that trigger strikes and protests. Unless rapid export diversification and urban employment raise real income and purchasing power, consumer welfare may be jeopardized under liberalization. Such results may expose the leadership to political risk. Minimum wages may be further raised to bolster income. However, with surplus labor conditions, effective compliance is a problem. Legal rates historically have been enforced only in the public sector and the most visible private sector entities such as foreign-owned plants and large domestic companies (6, 30).

Compensatory programs designed to train, employ, and help feed the most vulnerable social groups have emerged as a partial remedy to this problem. The Government of Morocco, USAID, and Catholic Relief Service have begun a pilot program (35). This is a step toward better targeting of subsidies and an improved use of scarce resources.

Slow Agricultural Supply Response

Economic simulation models suggest that price liberalization should lead to a lagged but appreciable supply response. In reality, many factors can combine to thwart the expected response and the subsequent increase in farmer welfare. Morocco faces five major impediments to a large supply response, especially with regard to corn and barley, two commodities that would receive a price stimulus with global liberalization: (1) high rates of on-farm grain consumption; (2) water scarcity; (3) a highly unequal pattern of landownership and insecure titles; (4) land fragmentation; and (5) a skewing of public agricultural investments to the small, irrigated sector (18). These factors could limit the output of the majority of farmers who are dryland, small-scale producers.

Conclusions

Morocco's agricultural policies and developments were surveyed and quantified between 1982 and 1989. It was at this time that Moroccan policymakers began to implement economic reforms. In agriculture, aggregate producer support diminished while consumer food subsidies fluctuated but remained high. Under Morocco's structural adjustment program, more changes are expected in the marketing channels. By 1993, all crops are expected to be liberalized and the grain marketing board either abolished or reformed. The new challenge facing Moroccan policymakers is to attain economic efficiency without sacrificing price and supply stabilization goals as they move away from state trade and price controls.

The various Government interventions analyzed were relatively successful in achieving the goals of increasing crop productivity, lowering import dependence, and stabilizing consumer food prices. For instance, crop yields for wheat, cotton, sugarbeets, and sugarcane rose. Wheat and sugar import dependence dropped to around 30-40 percent. Flour, sugar, and vegetable oil prices were more stable than the cost of living index.

The price and procurement support system was less effective than it might have been, especially in stimulating higher cereal production. Because of logistical problems, only a fraction of soft wheat and other major grains were ever purchased. Thus, despite the appearance of support, grain farmers were not fully protected from the effects of subsidizing soft wheat flour for consumers. On the other hand, consumers, both rich and poor, clearly benefited from the generally effective enforcement of subsidized food prices.

From the perspective of U.S. export interests, the Moroccan reduction in price support and input subsidies by 1989 creates export opportunities in wheat, corn, and cotton. The maintenance of a high level of consumer subsidies also helps to stimulate consumption demand and, in turn, import demand. The further planned reforms to the price and marketing structure of basic food commodities will, if implemented, rationalize production and consumption and guide Morocco to specialize in commodities for which it is a low-opportunity-cost producer.

The issues surrounding GATT-sanctioned agricultural and trade liberalization were assessed from the perspective of Morocco's policymakers. Morocco, while supportive of the thrust of the Uruguay round of GATT talks, remains a net food importer and would likely be subject to higher food prices if the round concludes successfully.

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Appendix I: PSE/CSE Estimation Methodology

This appendix explains how the effects of the policy interventions analyzed between 1982 and 1989--marketing board, credit, exchange rate, fertilizer, irrigation, and transport assistance for imported grain--were estimated, and notes the associated merits and biases of the selected approaches.

Pricing Policies

Price controls were enforced by marketing boards with an effect on both the PSE and the CSE. The level of marketing board intervention was estimated as the difference between the official producer price, plus a fixed margin for transportation and marketing cost (or consumer price paid), and the border price, multiplied by total ONICL purchases by grain type or total production in the case of sugar and cotton (or subsidized consumption quantities). The marketing board intervention in effect combines price supports and state marketing control. Because of the difficulty in separating the effects of these two policies, it is reported as a summary measure.

Because of the differences in the pricing and marketing of soft versus hard wheat, disaggregated data were used to estimate the level of intervention, then the amounts were summed. For example, soft wheat prices are generally supported above the open market rate and the import parity price. The official price for soft wheat averaged 150 percent above the import parity price (transported 175 km inland), and an average 25 percent over the market price from 1982-84 (19). Commercialization patterns are likewise different. Until 1988, nearly half of all soft wheat was sold through Government channels. Only 4 percent of hard wheat was so marketed (19). Hard wheat is mostly sold through weekly village markets (souks) and independent traders and unofficial prices averaged 25 percent higher than the Government floor price for 1982-84. Moroccan consumers seem willing to pay a premium for hard wheat because of taste preferences.

Official producer prices and official marketing board purchases were used for barley and corn PSE estimates. Barley is mostly marketed on a free market with the same price structure as hard wheat since 1984. Barley prices have experienced sharp seasonal and annual price movements because of fluctuating output and exports. Corn is also largely a free market crop but its price structure is not known. It is reported that free market prices for all cereals are generally below official support prices soon after the harvest season (July and August) when most producers sell their grain in order to meet debt obligations (13). In 1988 and 1989, corn and barley prices were fully liberalized and the border price was used to represent the producer price for those years (6).

The industrial crops, cotton and sugar, are sold mainly through Government channels (6). Accordingly, official producer prices were compared to either world or farmgate-equivalent reference prices, with little likelihood of bias. Ocean freight, port fees, and refining and transportation costs were included in the estimation of the sugar PSE, in order to derive a weighted farmgate price equivalent for raw beet and sugarcane. Seed cotton official producer prices were converted to a lint equivalent using a 30.5-percent ginning rate. Production quantities were utilized on a lint basis.

In calculating wheat flour and sugar CSE's, product differentiation at the retail level prompted the use of weighted prices. There are two kinds of flour, a "deluxe," high-quality brand and a lower quality "national" brand. The weights were the quantity shares of each differentiated product in the total quantity subsidized and consumed. Reference prices for flour were import unit values and incorporate some degree of concessionality reflecting the subsidy war for the Moroccan market between the EC and the United States. A comparison with a data series based on a world price of unmilled wheat transported to Morocco and converted to flour (factor equal to .70) showed negligible differences. Therefore, import unit values were used because of greater transparency. Raw

Caribbean sugar price, the closest to a free market price, was converted to refined border sugar price and used as the reference price for the sugar CSE.

Credit Policies

Estimates of credit subsidies were based on the credit subsidy allocated to crops according to the share of agricultural value in each crop. The estimate was derived by multiplying the amount of credit disbursed to agriculture by the interest rate differential between lending rates on non-agricultural and agricultural loans. Since the agricultural interest rate is lower, it represents preferential treatment. The subsidy value was then allocated to the various crops based on respective share of total agricultural value.

It is known that irrigated crops and fruits receive a greater share of the subsidies than do other crops, especially cereals. A recent study showed that irrigated, cash crops receive 70 percent of the input and credit subsidies (18, p.182). On average, only 15 percent of the soft wheat area was irrigated and lesser percentages were irrigated for hard wheat, barley, and corn between 1982 and 1984 (18, 19). However, without a clear distribution of irrigated cropland over the entire period and the lack of official data on credit distribution, the bias implied in using the value allocation approach is defensible in that there is some correlation between credit use and marketed surplus.

Foreign Exchange Controls

The effect of foreign exchange rate controls can be measured as the percent currency overvaluation multiplied by the international market value of each commodity's production or consumption. The method used is to estimate the free market equilibrium rate, which corrects for current account imbalances and for the effects of trade policies as reported by Hasan Tuluy and Lynn Salinger (World Bank, 1989). Their data series ended in 1984, so extrapolations were based on percent changes in the domestic and French consumer price indices, relative to official exchange rate changes. Since France is Morocco's leading trading partner, its CPI was used to indicate changes in the equilibrium rate.

Caution should be used in the interpretation of the barley, corn, and sugar estimates. While exchange rate overvaluation affects exporters of agricultural crops directly, in the case of non-exported or highly protected commodities, its effect is more indirect through cheapened import inputs that lower the cost of production and the signal of reference prices in decisionmaking. None of the studied commodities are exported, so more attention should be paid to the PSE, excluding the foreign exchange component. This modified measure reflects the relative direct levels of support or taxation. Indirect measures are not quantified.

Fertilizer Subsidies

In order to calculate the effect of fertilizer subsidies on producers, farmgate prices for urea were compared to the imported price, with a 10-percent mark-up for transportation, at the official exchange rate. The fertilizer price was converted to nutrient basis and if the international price equivalent in dirhams exceeded the local price, this represented a per-unit subsidy. If the reverse held, it represented a tax. The PSE is this rate multiplied by the quantity used on each crop.

Morocco exports large quantities of phosphate-based fertilizer but imports nitrogenous fertilizers, which are assumed to be a more important nutrient in the agricultural production process.

Consequently, the subsidy outlays were assumed to be directed to cover imported nitrogenous fertilizers.[10]

Irrigation Subsidies

Since 1930, Morocco has invested heavily in irrigation infrastructure and has subsidized the distribution of water. Not until the last two decades were attempts made to recover a modest portion of the investment costs through user fees and taxes. The estimate is the sum of annualized capital costs and user fee receipts minus operational expenses for nine large-scale perimeters. Commodity allocations are made according to area shares in the nine perimeters. Small- and medium-scale irrigated areas are unmeasured, and since most Government outlays are for the nine large-scale areas, the exclusion of other irrigation schemes was not considered significant.

Import Transport Subsidies

The final intervention calculated is an indirect transportation subsidy. The Government pays for the transport cost of imported wheat from port to flour mills.[11] This subsidy encourages millers to use imported grain as opposed to local grain, which they are prohibited from buying directly. Licensed commercial traders who supply the millers with domestic wheat incur transport costs, which they pass on to millers who then receive an allowance from the Government (13). Local producers, in contrast, absorb the full amount of transport cost between farmgate and the ONICL collection point (13). Thus, the intervention is a disincentive to local producers and is accordingly modeled as a hidden producer tax. It is calculated as the transport subsidy rate per ton of imported grain times the total wheat quantity purchased by ONICL.

[10]Potash and phosphate fertilizers were not studied.

[11]In most years only soft wheat is imported and in those years when hard wheat is imported, its share of the total is miniscule.

APPENDIX II: MOROCCAN PRODUCER SUBSIDY EQUIVALENTS
DATA ENTRY: JUL. 31, 1991, REVISED OCT. 23, 1991

GENERAL DATA: MOROCCO

	Items	UNITS	1982	1983	1984	1985	1986	1987	1988	1989	References and Formulae
A)	EXCHANGE RATE	Dirham/$	6.02	7.11	8.81	10.06	9.10	8.40	8.2	8.4882	(5)
B)	CPI, MOROCCO	(1985=100)	77.7	82.6	92.8	100.0	108.7	111.7	114.3	117.9	(5)
C)	CPI, France	(1985=100)	81.0	88.3	94.6	100.0	102.5	105.9	108.8	112.6	(5)
D)	UNOFFICIAL EXCHGE RATE	Dirham/$	6.9	8.3	9.5	9.7	10.3	10.2	10.2	10.2	(19)
E)	OVERVALUATION	Percent	13.8	16.2	7.8	-3.6	13.1	21.9	24.3	19.7	D-A/D*100
F)	FERTILIZER IMPORTS	US$ Mil	54.05	38.44	51.60	45.32	51.80	35.37	57.56	59	(23)
G)	LAND AREA, ALL CROPS	1000 Ha	8261	8330	8352	8404	8491	8731	8820	8961	(27)
H)	VALUE, ALL AGRIC.	Mil Dirhams	15983	17043	21567	29756	29702	22856	23157	24662	(27)
I)	CREDIT, ALL AGRIC.	Mil Dirhams	1723	2228	2393	2807	3717	3891	4144	4222	(6)
J)	TOTAL FERTILIZER USED	1000 TONS	231.3	249.9	250.6	302.5	314.2	305.6	317.5	322.6	(27)
K)	FERT PR, N in UREA, loc.	Dirhams/Ton	1504	2235	2235	2589	2589	3003.2	3363.62	3699.99	(23)
L)	FERT PRICE, UREA Int'l	$/ton	159.5	124.5	171.2	136.3	107	117.1	155	136.8	(5)
M)	FERT PRICE, UREA Int'l	Dirhams/Ton	960.2	885.2	1508.3	1371.2	973.7	983.6	1271.0	1161.2	L*A
N)	FERT SUBSIDY, UREA	Dirhams/Ton	379.4	-32.0	653.3	343.2	-94.0	-269.5	-115.5	-387.7	K-M (10% TRANSPORT SURCHARGE INCLUDED)
O)	NAT'L AG CREDIT RATE	Percent	8	9	10	10	10	10	10	10	(6)
P)	MEDIUM TERM CREDIT	Percent	13	13	13	15	15	15	13.5	13.5	(6)
Q)	INTEREST RATE SUBSIDY	Percent	5	4	3	5	5	5	3.5	3.5	P - O
R)	LAND AREA, IRRIGATED	1000 ha	1230	1234	1240	1245	1250	1255	1260	1265	(27)
S)	FERT PRICE, UREA, local	MIL Dirhams	676.8	1005.75	1005.75	1165.1	1165.1	1351.5	1513.63	1665.00	CORRECTED BY FACTOR OF 45% TO ACCT FOR N CONTENT
T)	CAPITAL COST SUBS.IRRIG.	MIL Dirhams	14.22	14.51	33.73	42.61	71.93	54.39	47.41	45.60	See Appendix IV
U)	OPERATION SUBS. IRRIG	MIL Dirhams	145.15	157.60	154.91	133.21	131.65	141.03	152.58	160.01	See Appendix IV
V)	TOTAL IRRIG. SUBSIDY	MIL Dirhams	159.37	172.11	188.64	175.82	203.57	195.42	199.99	205.60	T+U

Appendix II: (cont)

COMMODITY: WHEAT

Items	UNITS	1982	1983	1984	1985	1986	1987	1988	1989	References and Formulae
AA) PRODUCTION, TOTAL	1000 TONS	2183	1971	1989	2359	3809	2428	4019	3927	AB+AC
AB) SOFT	1000 TONS	777	732	818	1017	1828	1302	2253	2160	(27) and (6)
AC) HARD	1000 TONS	1406	1239	1171	1342	1981	1126	1766	1767	(27) and (6)
AE) ONICL PURCHASED SOFT	1000 TONS	479.3	356.2	307.3	323.2	922.3	519.97	1081.44	1080	(13)
AF) ONICL PURCHASED HARD	1000 TONS	51.4	57.8	43.7	40.7	45.8	34.04	0	0	(13)
AG) IMPORTS (SOFT)	1000 TONS	1331	2128	2425	2019	1500	1900	1300	1006	(27) and (30)
AH) IMPORTS	Mil Dirhams	5024.5	8788.6	10235.9	8580.8	7693.5	8510.1	6844.5	5040.1	AG*AR/1000
AI) SOFT PRODUCER PRICE	Dirhams/Ton	1400	1400	1500	1800	2000	2000	2000	2200	(6)
AJ) HARD PRODUCER PRICE	Dirhams/Ton	1400	1400	1500	1800	2000	2000	1391.05	1618.19	(6)
AK) MARKETING COST	Dirhams/Ton	132.03	138.831	154.6	165.73	180.15	185.55	190.3787	197.2324	MARA/DPAE Staff;
AL) SOFT PR+MK COST	Dirhams/Ton	1532.0	1538.83	1654.6	1965.7	2180.1	2185.6	2190.379	2397.232	AI+AK
AM) HARD PR+MK COST	Dirhams/Ton	1532.0	1538.83	1654.6	1965.7	2180.1	2185.6	1581.427	1815.423	AJ+AK
AN) WORLD PRICE	$/TON	160.20	157.26	152.48	135.95	115.00	112.80	145.14	169.39	(5) (Note: x 36.744 convt. factor)
AO) OCEAN FREIGHT	$/TON	18.83	13.54	15.21	14.81	12.88	12.88	24.5	21.25	World Wheat Statistics, US GULF-Morocco Ve
AP) IMPORT PRICE	$/TON	179.03	170.80	167.69	150.76	127.88	125.68	169.64	190.64	AN+AO
AQ) WORLD PRICE	Dirhams/TON	1078	1214	1477	1517	1164	1056	1391	1618	AP*A
AR) CONSUMPTION	1000 TONS	3775	4130	4221	4250	5129	4479	5265	5010	(27)
AS) LAND AREA, WHEAT	1000 Ha	1686	1976	1856	1894	2226	2288	2317	2630	(27)
AT) MARKETING BOARD (PSE)	Mil Dirhams	241.1	134.3	62.2	163.4	984.0	625.9	864.4	841.4	((AL-AQ)*AE/1000)+((AM-AQ)*AF/1000)
AU) SOFT MKT. BOARD (PSE)	Mil Dirhams	217.73	115.567	54.46926	145.14	937.46	587.48	864.4282	841.3653	(AL-AQ)*AE/1000
AV) HARD MKT. BOARD (PSE)	Mil Dirhams	23.349	18.7528	7.745873	18.278	46.553	38.460	0	0	(AM-AQ)*AF/1000
AW) TRANS SUBSIDY RATE	DH/Ton	50.9	54	60.9	65.6	71.3	73.2	74.9	77.3	(19)
AX) TRANS SUBSIDY PAID	Mil Dirhams	67.748	114.912	147.6825	132.45	106.95	139.08	97.37	77.7638	AG/1000*AW
AY) IMPORT TRANS SUBSIDY	Mil Dirhams	-27.01	-86.141	-90.0285	-109.2	-207.0	-120.5	-213.273	-220.073	-(AE+AF)/1000*AW
AZ) FERTILIZER (PSE)	Mil Dirhams	117.7	-12.8	281.4	173.4	-62.9	-188.7	-86.2	-294.6	AB*N/1000
BA) FOREIGN EXCHANGE (PSE)	Mil Dirhams	-161.2	-197.7	-279.2	-346.9	-456.4	-262.4	-570.0	-645.7	-E*AQ*AA/100000
BB) FERTILIZER USED	1000 TONS	310.1	401.0	430.7	505.3	669.1	700.4	745.9	760.0	0.18*J
BC) CREDIT (PSE)	Mil Dirhams	16.5	14.4	9.9	20.0	47.7	41.3	50.3	51.8	BF/H*I*Q/100
BD) AREA SHARE IRRIG.	PERCENT	35.5	35.5	39.16794	39.195	43.265	39.923	44.90837	46.21082	(See Appendix IV)
BE) IRRIG. SUBSIDY	Mil Dirhams	56.578	61.0986	73.88802	68.912	88.077	78.018	89.81125	95.01107	BD/100*V
BF) VALUE OF PRODUCTION	Mil Dirhams	3056.2	2759.4	2983.5	4246.2	7618	4856	8038	8639.4	AA*AI/1000
BG) PSE (per unit value)	PERCENT	8.0	-3.1	2.0	-.7	5.2	3.6	1.7	-2.0	(AT+AY+AZ+BA+BC+BE)/(BF)*100

Appendix II: (cont)

COMMODITY: CORN

Items	UNITS	1982	1983	1984	1985	1986	1987	1988	1989	References and Formulae
CB) PRODUCTION	1000 TONS	247	258	264	321	307	240	358	403	(27)
CC) IMPORTS	1000 TONS	139	168	196	166	170	219	110	91	(21)
CD) IMPORTS	MIL $	19.70	25.05	21.50	21.45	21.68	22.11	18.262	9.3	(21)
CE) ONICL PURCHASED	1000 TONS	68.7	57	56.7	84.2	136.7	51.5	0	0	(6)
CF) PRODUCER PRICE	Dirhams/Ton	1000	1300	1600	1800	1800	1800	1361.35	867.48	(6)
CG) MARKETING COST	Dirhams/Ton	132.03	138.831	154.6	165.73	180.15	185.55	190.3787	197.2324	MARA/DPAE Staff
CH) PRODUCER PR+MK COST	Dirhams/Ton	1132.0	1438.83	1754.6	1965.7	1980.1	1985.6	1551.729	1064.712	CF+CG
CI) WORLD PRICE	$/TON	141.7	149.1	109.7	129.2	127.5	101.0	166.0	102.2	1000*CD/CC
CJ) WORLD PRICE	Dirhams/Ton	853.28	1060.24	966.40	1300	1161	848.05	1361.35	867.48	A*CI
CK) LAND AREA, CORN	1000 Ha	400	435	384	401	395	368	396	406	(24) and (21)
CL) FERTILIZER (PSE)	MIL Dirhams	3.5	-.3	6.5	4.2	-1.2	-3.3	-1.5	-5.0	CN*N/1000
CM) CONSUMPTION	1000 TONS	399	412	477	487	467	464	468	494	(21)
CN) FERTILIZER USED	1000 TONS	9.252	9.996	10.024	12.1	12.568	12.224	12.7	12.904	.04*J
CQ) MARKETING BOARD (PSE)	MIL Dirhams	19.15	21.58	44.69	56.06	112.04	58.58	.00	.00	(CH-CJ)*CE1000
CR) FOREIGN EXCHANGE (PSE)	MIL Dirhams	-29.1	-44.2	-20.0	15.1	-46.8	-44.5	-118.7	-68.9	-E*CJ*CB/100000
CS) CREDIT (PSE)	MIL Dirhams	1.33	1.75	1.41	2.73	3.46	3.68	3.05	2.09	CV/H*I*Q/100
CT) AREA SHARE IRRIG.	PERCENT	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	See Appendix IV
CU) IRRIG. SUBSIDY	Mil Dirhams	15.619	16.8667	18.48713	17.230	19.950	19.151	19.59880	20.14915	CT/100*V
CV) VALUE OF PRODUCTION	Mil Dirhams	247	335.4	422.4	577.8	552.6	432	487.3633	349.5944	CB*CF/1000
CW) PSE (per unit value)	PERCENT	4.3	-1.3	12.1	16.5	15.8	7.8	-20.0	-14.8	(CL+CQ+CR+CU)/(CV)*100

COMMODITY: BARLEY

Items	UNITS	1982	1983	1984	1985	1986	1987	1988	1989	References and Formulae
DA) PRODUCTION	1000 TONS	2334	1228	1405	2025	2820	1543	3454	2999	(27)
DB) IMPORTS	1000 TONS	1.0	.0	111.0	5.0	5.0	5.0	0	0	(27)
DC) IMPORTS	MIL Dirhams	.7	.0	124.2	5.7	5.2	4.4	.0	.0	DB*DJ/1000
DD) ONICL PURCHASES	1000 Tons	175.4	33	27.9	249.1	497.7	134.2	0	0	(19) and (13)
DE) PRODUCER PRICE	Dirhams/Ton	1416.2	929.9	1281.2	1440.2	1812.0	1968.0	793.4	1108.7	(6)
DF) MARKETING COST	Dirhams/Ton	132.03	138.831	154.6	165.73	180.15	185.55	190.3787	197.2324	MARA/DPAE staff
DG) PRODUCER PR+MK COST	Dirhams/Ton	1699.4	1115.88	1537.44	1728.2	2174.4	2361.6	952.08	1330.44	DE+DF
DH) WORLD PRICE	$/TON	91.0	92.0	102.0	89.0	89.0	79.0	72.76	109.62	FATUS U.S. export unit values to N. Africa
DI) FREIGHT	$/TON	25.0	25.0	25.0	25.0	25.0	25.0	24	21	World Wheat Statistics
DJ) WORLD PRICE (Import)	Dirhams/Ton	698.3	831.9	1118.9	1146.8	1037.4	873.6	793.4	1108.7	(DH+DI)*A
DK) LAND AREA, BARLEY	1000 HA	2047	2151	2126	2383	2472	2314	2499	2399	(27)
DL) CONSUMPTION	1000 TONS	2244	1419	1517	1850	2066	2368	2759	3159	(27)
DM) MARKETING BOARD (PSE)	MIL Dirhams	175.6	9.4	11.7	144.8	565.9	199.7	.0	.0	(DG-DJ)*DD/1000
DN) FOREIGN EXCHANGE (PSE)	MIL Dirhams	-224.7	-165.2	-123.1	84.3	-384.4	-295.0	-667.2	-655.5	-E*DJ*DA/100000
DO) CREDIT (PSE)	MIL Dirhams	17.8	6.0	6.0	13.8	32.0	25.8	17.2	19.9	DP/H*I*Q/100
DP) AREA SHARE IRRIG.	PERCENT	20.043	14.7203	15.60521	12.096	10.759	7.1486	10.07668	10.96166	(See Appendix IV)
DQ) IRRIG. SUBSIDY	Mil Dirhams	31.943	25.3349	29.43831	21.267	21.903	13.970	20.15213	22.53756	DP/100*V
DR) VALUE OF PRODUCTION	Mil Dirhams	3305.4	1141.92	1800.086	2916.4	5109.8	3036.6	2740.404	3324.991	DA*DE/1000
DS) PSE (per unit value)	PERCENT	.0	-10.9	-4.2	9.1	4.6	-1.8	-23.0	-18.4	(DM+DN+DO+DQ)/DR)*100

Appendix II: (cont)

COMMODITY: COTTON (LINT)

Items	UNITS	1982	1983	1984	1985	1986	1987	1988	1989	References and Formulae
EC) PRODUCTION	1000 TONS	6	7	4	8	8	11	9	9	(27)
ED) IMPORTS	1000 TONS	13	11	17	17	23	21	29	30	(27)
EE) IMPORTS	MIL Dirhams	125.1	145.0	267.2	225.9	221.2	290.8	333.0	426.4	ED*EI/1000
EF) PRODUCER PRICE(LINT EQ)	Dirhams/TON	11770.	13114.8	16393.44	18033.	19672.	19672.	19672.13	20655.74	(6)
EG) MARKETING COST	Dirhams/Ton	-774.1	111.065	123.68	132.58	144.12	148.44	152.3030	157.7859	MARA/DPAE Staff
EH) PRODUCER PR+MK COST	Dirhams/Ton	14125.	15737.7	19672.13	21639.	23607.	23607.	23606.56	24786.89	EF+EG
EI) WORLD PRICE	$/TON	1599	1854	1784	1321	1057	1648	1400.36	1674.39	(5) Conversion: $/ton=cents/lbs*2204.6/10
EJ) WORLD PRICE	Dirhams/Ton	9623.3	13182.4	15720.6	13289	9617.6	13846	11483.0	14212.6	EI*A
EK) LAND AREA, COTTON	1000 Ha	11	11	9	13	14	15	18	14	(27)
EL) CONSUMPTION	1000 TONS	20	17	17	21	26	25	30	34	(27)
EM) MARKETING BOARD (PSE)	MIL Dirhams	27.01	17.89	15.81	66.80	111.91	107.36	109.11	95.17	(EH-EJ)*EC/1000
EN) FERTILIZER USED	1000 TONS	20.82	22.49	22.55	27.23	28.28	27.50	28.58	29.03	J*0.09
EO) FERTILIZER (PSE)	MIL Dirhams	7.9	-.7	14.7	9.3	-2.7	-7.4	-3.3	-11.3	(EN*N)/1000
EP) FOREIGN EXCHANGE (PSE)	MIL Dirhams	-7.96	-14.93	-4.92	3.86	-10.11	-33.34	-25.16	-25.22	-E*EJ*EC/100000
EQ) CREDIT (PSE)	MIL Dirhams	.38	.48	.22	.68	.98	1.84	1.11	1.11	ET/H*I*Q/100
ER) AREA SHARE IRRIG.	PERCENT	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	(See Appendix IV)
ES) IRRIG. SUBSIDY	Mil Dirhams	3.67	3.96	4.34	4.04	4.68	4.49	4.60	4.73	ER/100*V
ET) VALUE OF PRODUCTION	Mil Dirhams	70.623	91.8033	65.57377	144.26	157.38	216.39	177.0492	185.9016	EC*EF/1000
EU) PSE (per unit value)	PERCENT	43.9	7.3	46.0	58.7	66.6	33.7	48.8	34.7	(EM+EO+EP+ES)/(ET)*100

Appendix II: (cont)
COMMODITY: SUGAR

Items	UNITS	1982	1983	1984	1985	1986	1987	1988	1989	References and Formulae
FC) PRODUCTION	1000 TONS	384	470	451	490	439	540	690	610	(21) raw centrifugal
FD) IMPORTS	1000 TONS	350	270	247	319	238	297	295	283	(27)
FE) IMPORTS	MIL Dirhams	430.3	384.5	282.6	334.1	316.8	403.9	602.7	729.4	FD*FJ/1000
FF) PRODUCER PRICE	Dirhams/Ton	144	144	161.8	173.5	198.5	198.5	195.2	216.6	(6)
FG) FOB CARIBBEAN	$/ton	8.41	8.47	5.2	4.05	6.05	6.76	10.19	12.81	(5) raw sugar
FH) WORLD PRICE	$/TON	185.4	186.7	114.6	89.3	133.4	149.0	224.6	282.4	(5)
FI) FREIGHT	$/TON	18.83	13.54	15.21	14.81	12.88	12.88	24.5	21.25	WHEAT STATISTICS
FJ) WORLD PRICE (RAW)	Dirhams/Ton	1229	1423.91	1143.96	1047	1331	1360	2043.01	2577.50	(FH+FI)*A
FK) WORLD PRICE (REFINED)	Dirhams/Ton	1315.6	1523.58	1224.042	1120.5	1424.1	1455.2	2186.018	2757.930	FG*1.07 Convertion factor raw to refined s
FL) PORT & DELIVERY COSTS	Dirhams/Ton	212.95	204.52	218.64	235.60	256.10	263.17	269.2947	277.7765	Tuluy: World Bank Report p 179. Handling F
FL) SUGAR MILL PRICE REFINED	Dirhams/Ton	1528.5	1728.10	1442.682	1554.6	1689.9	1736.5	1776.925	1832.891	FK+FL
FM) REFINING COST	Dirhams/Ton	627.22	665.29	750	808.19	878.50	902.75	923.7608	952.8556	(19) p. 179.
FN) MILLGATE VALUE REFINED	Dirhams/Ton	901.29	1062.81	692.6824	746.42	811.36	833.76	853.1637	880.0350	FL-FM
FO) MILLGT VALUE RAW BEET	Dirhams/Ton	130.60	154.001	100.3697	108.16	117.57	120.81	123.6234	127.5171	FN*.1449 Conversion factor-beet
FP) MILLGT VALUE RAW CANE	Dirhams/Ton	94.636	111.595	72.73165	78.375	85.193	87.544	89.58219	92.40368	FN*.105 Conversion factor-cane
FQ) DELIVERY COST FARM-MILL	Dirhams/Ton	35.3	35.3	35.3	38.039	41.348	42.489	43.47834	44.84774	(19) p. 179.
FR) FARMGT EQUIV. BEET PR	Dirhams/Ton	165.90	189.301	135.6697	146.20	145.93	112.30	113.7714	121.1685	FO+FQ
FS) FARMGT EQUIV. CANE PR	Dirhams/Ton	129.94	146.895	108.0316	116.41	126.54	130.03	133.0605	137.2514	FP+FQ
FT) FARMGT WEIGHTED PRICE	Dirhams/Ton	159.40	179.925	129.1789	138.96	141.44	116.48	118.9419	125.3482	(FR*GG)+(FS*GH)
FU) LAND AREA, SUGAR	1000 Ha	65.0	71.0	71.0	66.0	64.0	74.0	74	75	(21) cane+beet
FV) FERTILIZER (PSE)	MIL Dirhams	10.1	-.9	18.8	11.9	-3.4	-9.5	-4.2	-14.4	FX*N/1000
FW) CONSUMPTION	1000 TONS	680	712	740	672	707	722	741	783	(27)
FX) FERTILIZER USED	1000 TONS	26.6	28.7	28.8	34.8	36.1	35.1	36.5	37.1	J*0.115
FY) MARKETING BOARD (PSE)	MIL Dirhams	-5.91	-16.88	14.71	16.92	25.05	44.29	52.62	55.66	(FF-FT)*FC/1000
FZ) FOREIGN EXCHNAGE (PSE)	MIL Dirhams	-65.09	-108.25	-40.41	18.63	-76.78	-161	-343.21	-309.94	-E*FJ*FC/100000
GA) CREDIT (PSE)	MIL Dirhams	.30	.35	.24	.40	.55	.91	.84	.79	GD/H*I*Q/100
GB) AREA SHARE IRRIG.	PERCENT	15.1	15.1	15.58	16.06	16.54	17.02	17.5	17.98	(See Appendix IV)
GC) IRRIG. SUBSIDY	MIL DH	24.07	25.99	29.39	28.24	33.67	33.26	35.00	36.97	FY/100*V
GD) VALUE OF PRODUCTION	Mil Dirhams	55.296	67.68	72.9718	85.015	87.142	107.19	134.688	132.126	FC*FF/1000
GE) BEET PRODUCTION	1000 MT	2314	2589	2525	2245	2625	2750	2990	2808	(21)
GF) CANE PRODUCTION	1000 MT	510	735	775	720	792	848	1095	986	(21)
GG) BEET SHARE	PERCENT	.81941	.778881	.7651515	.75717	.76822	.76431	.7319461	.7401160	GB/(GB+GC)
GH) CANE SHARE	PERCENT	.18059	.221119	.2348485	.24283	.23178	.23569	.2680539	.2598840	GC/(GB+GC)
GI) PSE (per unit value)	PERCENT	-66.1	-147.3	31.2	89.5	-24.0	-85.6	-192.3	-174.8	(FV+FY+FZ+GA+GC)/(GD)*100
GG) PSE w/o FEX transfer	PERCENT	8.09	-25.79	46.30	34.42	25.48	33.339	36.56112	31.84256	(FV+FY+GA+GC)/(GD)*100

APPENDIX III: MOROCCAN CONSUMER SUBSIDY EQUIVALENTS

Commodity: Refined Sugar

Items	Units	1982	1983	1984	1985	1986	1987	1988	1989	References and Formulae
GA) Level of consumption	1000 MT	680	712	740	672	707	722	741	783	(27)
GB) Quantity Subsidized	1000 MT	600.00	620.00	631.00	650.00	694.00	650.00	700.00	725.00	(6)
GC) Cubes	1000 MT					494.00	435.00	448.00	469.00	(6)
GD) Granulated	1000 MT					200.00	215.00	252.00	256.00	(6)
GE) Cube Share	Pct	67.00	67.00	67.00	67.00	71.18	66.92	64.00	64.69	(6)
GF) Granulated Share	Pct	33.00	33.00	33.00	33.00	28.82	33.08	36.00	35.31	(6)
GG) Consumer price (weighted)	Dirhams/ton	3235.50	3637.50	3654.00	3810.60	4168.59	4119.62	4086.00	4093.93	GE*GH+GF*GI
GH) Cube price	Dirhams/ton	3450.00	4050.00	4050.00	4200.00	4500.00	4500.00	4500.00	4500.00	(6)
GI) Granulated price	Dirhams/ton	2800.00	2800.00	2850.00	3020.00	3350.00	3350.00	3350.00	3350.00	(6)
GJ) Border Price Refined	Dirhmas/ton	1315.56	1523.58	1224.04	1120.51	1424.11	1455.25	2186.02	2757.93	FOB Carib. Ref=(Raw) *1.07
GK) Transport & Marketing Cost	Dirhams/ton	212.95	204.52	218.64	235.60	256.10	263.16	269.29	277.77	(19)
GL) Reference price	Dirhams/ton	1528.51	1728.10	1442.68	1356.11	1680.21	1718.41	2455.31	3035.70	GJ+GK
GM) Cost to consumers	Mil Dirhams	1941.30	2255.25	2305.67	2476.89	2893.00	2677.75	2860.20	2968.10	GB*GG/1000
GN) Policy transfers to consumers	Mil Dirhams	-880.89	-984.82	-1311.73	-1628.50	-1570.83	-1289.24	-698.52	-298.65	GO+GP
GO) Foreign Exchange	Mil Dirhams	143.30	199.01	83.61	-33.08	156.11	271.55	442.96	468.56	(E*GL*GA)/100000
GP) Price subsidy	Mil Dirhams	-1024.19	-1183.83	-1395.34	-1595.42	-1726.93	-1560.79	-1141.48	-767.22	(GL-GG)*GB/1000
GQ) CSE as ratio to consumers' cost	Pct	-45.38	-43.67	-56.89	-65.75	-54.30	-48.15	-24.42	-10.06	GN/GM*100
GR) CSE per ton, local currency	Dirhams/ton	-1468.15	-1588.41	-2078.81	-2505.39	-2263.44	-1983.44	-997.89	-411.94	GM/GB*1000
GS) CSE per ton, in US dollars	US$/ton	-243.88	-223.41	-235.96	-249.04	-248.73	-236.12	-121.69	-48.53	GR/A

Commodity: Wheat Flour

Items	Units	1982	1983	1984	1985	1986	1987	1988	1989	References and Formulae
HA) Level of consumption (unmilled)	1000 MT	3775.00	4130.00	4221.00	4250.00	5129.00	4479.00	5265.00	5010.00	(27)
HB) Level of consumption (flour)	1000 MT	2642.50	2891.00	2954.70	2975.00	3590.30	3135.30	3685.50	3507.00	HA*.70
HC) Quantity of flour subsidized	1000 MT	1680.00	1716.00	1159.00	1787.00	1824.00	1884.00	1530.00	1000.00	(6)
HD) Low quality flour	1000 MT					1498.00	1547.00	1310.00	1000.00	(6)
HE) High quality flour	1000 MT					326.00	337.00	220.00	.00	(6)
HF) Low quality share	Pct	83.00	83.00	83.00	83.00	82.13	82.11	85.62	100.00	(6)
HG) High quality share	Pct	17.00	17.00	17.00	17.00	17.87	17.89	14.38	.00	(6)
HH) Consumer price (weighted)	Dirham/ton	1268.00	1363.20	996.00	1062.40	1727.03	1727.26	1743.94	1650.00	HI*HF/100+HJ*HG/100
HI) Low quality price	Dirham/ton	1200.00	1200.00	1200.00	1280.00	1450.00	1450.00	1533.00	1650.00	(6)
HJ) High quality price	Dirham)tiN	1600.00	2160.01	.0276566		3000.00	3000.00	3000.00	3000.00	(6)
HK) Reference price	US $/ton	322.22	274.50	323.52	300.00	250.00	220.00	152.77	252.00	(21) Import unit values
HL) Reference price	Dirhams/ton	1939.76	1951.70	2850.21	3018.00	2275.00	1848.00	1252.71	2139.03	HK*A
HM) Cost to consumers	Mil Dirhams	2130.24	2339.25	1154.37	1898.51	3150.10	3254.15	2668.23	1650.00	HC*HH/1000
HN) Policy transfers to consumer	Mil Dirhams	1835.28	1922.47	2808.60	3168.70	2072.88	1495.61	372.49	1967.79	HO+HP
HO) Foreign Exchange	Mil Dirhams	706.72	912.62	659.57	-325.95	1073.38	1268.13	1124.06	1478.77	(E*HL*HB)/100000
HP) Price Subsidy	Mil Dirhams	1128.56	1009.86	2149.03	3494.66	999.50	227.48	-751.58	489.03	(HL-HH)*HC/1000
HQ) CSE as ratio to consumers' cost	Pct	86.15	82.18	243.30	166.90	65.80	45.96	13.96	119.26	HN/HM*100
HR) CSE per ton, local currency	Dirhams/ton	1092.43	1120.32	2423.30	1773.20	1136.45	793.85	243.45	1967.79	HN/HC*1000
HS) CSE per ton, in US dollars	US$/ton	181.47	157.57	275.06	176.26	124.88	94.51	29.69	231.83	HR/A

Appendix III: (cont)
Commodity:

Item: Edible Vegetable Oils:	Units	1982	1983	1984	1985	1986	1987	1988	1989	References and Formulae
IA) Level of consumption	1000 liters	180.00	190.00	203.00	200.00	209.00	209.00	238.00	240.00	(6)
IB) Average consumer price	Dirhams/liter	4.60	6.00	6.00	6.33	7.00	7.00	7.00	7.00	(6)
IC) Reference price	Dirhams/liter	5.66	7.56	9.25	10.06	8.66	7.61	7.63	8.79	(6) Retail + subsidy
ID) Cost to consmuer	Mil Dirhams	1.02	1.44	1.88	2.01	1.81	1.59	1.82	2.11	IA*IB
IE) Policy transfers to consumer	Mil Dirhams	.33	.53	.81	.67	.58	.48	.59	.85	IF+IG
IF) Foreign Exchange	Mil Dirhams	.14	.23	.15	-.07	.24	.35	.44	.42	(E*IC*IA)/100000
IG) Price Subsidy	Mil Dirhams	.19	.30	.66	.75	.35	.13	.15	.43	(IC-IB)*IA/1000
IH) CSE as ratio to consumers' cost	Pct	32.52	36.81	42.97	33.45	32.31	29.90	32.60	40.08	IE/ID*100
II) CSE per ton, local currency	Dirhams/liter	1.84	2.78	3.97	3.36	2.80	2.28	2.49	3.52	IE/IA*1000
IG) CSE per ton, in US dollars	US$/liter	.31	.39	.45	.33	.31	.27	.30	.42	II/A

SUMMARY:

Items	Units	1982	1983	1984	1985	1986	1987	1988	1989
CSE's by commodity									
Sugar	Percent	-45.38	-43.67	-56.89	-65.75	-54.30	-48.15	-24.42	-10.06
Wheat flour	Percent	86.15	82.18	243.30	166.90	65.80	45.96	13.96	119.26
Vegetable oil	Percent	32.52	36.81	42.97	33.45	32.31	29.90	32.60	40.08
3-commodity aggregate	Percent	23.44	20.41	43.26	35.20	8.31	3.49	-5.88	36.15
Transfers by Instrument									
Foreign exchange	Mil Dirhams	850.16	1111.86	743.33	-359.11	1229.72	1540.03	1567.47	1947.75
Price subsidy	Mil Dirhams	104.56	-173.68	754.34	1899.98	-727.09	-1333.18	-1892.91	-277.76
Transfers by commodity									
Sugar	Mil Dirhams	-243.88	-223.41	-235.96	-249.04	-248.73	-236.12	-121.69	-48.53
Wheat flour	Mil Dirhams	181.47	157.57	275.06	176.26	124.88	94.51	29.69	231.83
Vegetable oil	Mil Dirhams	.31	.39	.45	.33	.31	.27	.30	.42
Cost to Consumers	Mil Dirhams	4072.56	4595.94	3461.92	4377.41	6044.91	5933.49	5530.25	4620.21
Total Transfers to Consumers	Mil Dirhams	954.72	938.18	1497.68	1540.87	502.63	206.85	-325.45	1669.99

GENERAL DATA: MOROCCO
Updated: July 31, 1991

Items	UNITS	1982	1983	1984	1985	1986	1987	1988	1989	References and Formulae
A) EXCHANGE RATE	Dirham/$	6.02	7.11	8.81	10.06	9.10	8.40	8.20	8.49	(5)
B) CPI, MOROCCO	(1985=100)	77.7	82.6	92.8	100.0	108.7	111.70	114.30	117.90	(5)
C) CPI, France	(1985=100)	80.3	88.0	94.6	100.0	102.5	105.9	108.80	112.60	(5)
D) UNOFFICIAL EXCHGE RATE	Dhems/$	6.9	8.3	9.5	9.7	10.3	10.2	10.2	10.2	(19)
E) OVERVALUATION	Percent	13.8	16.2	7.8	-3.6	13.1	21.9	24.3	19.7	D-A/D*100

APPENDIX IV: ESTIMATION OF MOROCCAN IRRIGATION SUBSIDIES

I. SUBSIDY ON CAPITAL COST OF LARGE IRRIGATION PERIMETERS

	UNIT	1982	1983	1984	1985	1986	1987	1988	1989	SOURCES:
A. ESTIMATED CAPITAL COST PER GROSS IRRIGATED AREA IN CURRENT PRICES	DH/HA	403	403	919	1070	1618	1200	1046	1006	Moroccan Ministry of Agriculture
B. LENDING INTEREST RATE	PERCENT	7.00	7.00	7.00	7.80	8.80	9.00	9.00	9.00	(5)
C. AVERAGE DEPRECIATION FOR IRRIGATION PROJECTS	PERCENT	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	(35)
D. ANNUALIZED CAPITAL COST	DH/HA	34.26	34.26	78.12	99.51	166.65	126.00	109.83	105.63	(A*(B+C)/100)
E. GROSS LARGE SCALE IRRIG. AREA	HA	415105	423647	431843	428207	431610	431650	431650	431650	SEE TABLE III.
F. ESTIMATED ANNUAL COST	MIL DH	14.22	14.51	33.73	42.61	71.93	54.39	47.41	45.60	(D*E)/10000000

II. SUBSIDY ON OPERATION AND MAINTENANCE OF LARGE SCALE IRRIGATION PERIMETERS

	UNIT	1982	1983	1984	1985	1986	1987	1988	1989	SOURCES:
A. ESTIMATED OPERATION & MAINTENANCE EXPENSE	DH/HA	699.35	744	797.22	864.08	897.01	941.58	1039.66	1235.7	Moroccan Ministry of Agriculture
B. ESTIMATED RECIEPTS	DH/HA	349.67	372	438.5	553	592	614.85	686.18	864.96	Moroccan Ministry of Agriculture
C. SUBSIDY PER HA	DH/HA	349.68	372	358.72	311.08	305.01	326.73	353.48	370.69	(A-B)
D. GROSS LARGE SCALE IRRIG. AREA	HA	415105	423647	431843	428207	431610	431650	431650	431650	SEE TABLE III.
E. ESTIMATED ANNUAL SUBSIDY	MIL DH	145.15	157.60	154.91	133.21	131.65	141.03	152.58	160.01	(C*D)/1000000
TOTAL IRRIGATION SUBSIDY	MIL DH	159.37	172.1087	188.6441	175.8175	203.5749	195.4209	199.9878	205.60	(I.F+II.E)

Appendix IV: Estimation of Moroccan Irrigation Subsidies (cont.)

III. GROSS AREA IN LARGE SCALE IRRIGATED PERIMETERS

INDIVIDUAL PROJECTS	UNIT	1982	1983	1984	1985	1986	1987	1988	1989
BASSE MOULOUYA	HA	61890	63783	65400	65400	65400	65400	65400	65400
GHARB		75110	75110	75110	76750	76750	76750	76750	76750
DOUKKALA		48699	51645	56400	58050	59700	59700	59700	59700
HAOUZ		38018	38018	38018	30050	30050	30050	30050	30050
TADLA		104100	104100	101750	99400	97050	97050	97050	97050
TAFILALET		25734	26259	26795	27342	27900	27900	27900	27900
OUARZAZATE		19697	22608	26000	26000	26000	26000	26000	26000
SOUSS MASSA		25670	25670	25670	29215	32760	32760	32760	32760
LOUKKOS		16187	16454	16700	16000	16000	16000	16000	16000
TOTAL		415105	423647	431843	428207	431610	431610	431610	431610

IV. DISTRIBUTION OF IRRIGATED CROPS BY AREA (AVG. 1981-83)

	AREA (ha)	SHARE (%)
WHEAT	141.4	35.54
CORN	9.8	2.46
SUGAR	59.9	15.05
COTTON	9.1	2.29
BEAN	46.6	11.71
FORAGE	45.7	11.49
FRUIT	60.4	15.18
OTHER	25	6.28
TOTAL	397.9	100

Source: MARA/DPAE; Modamed Feddoul

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